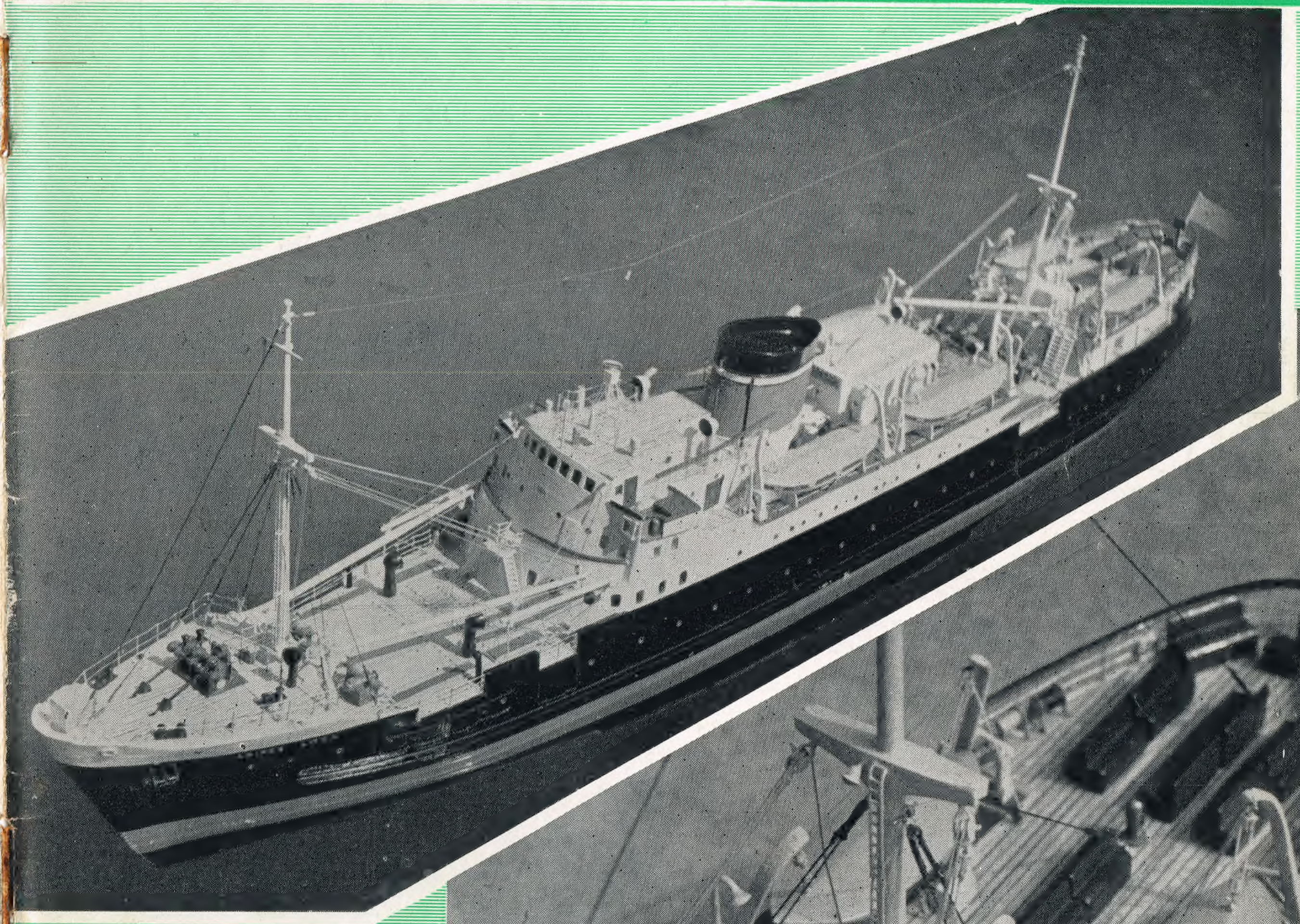
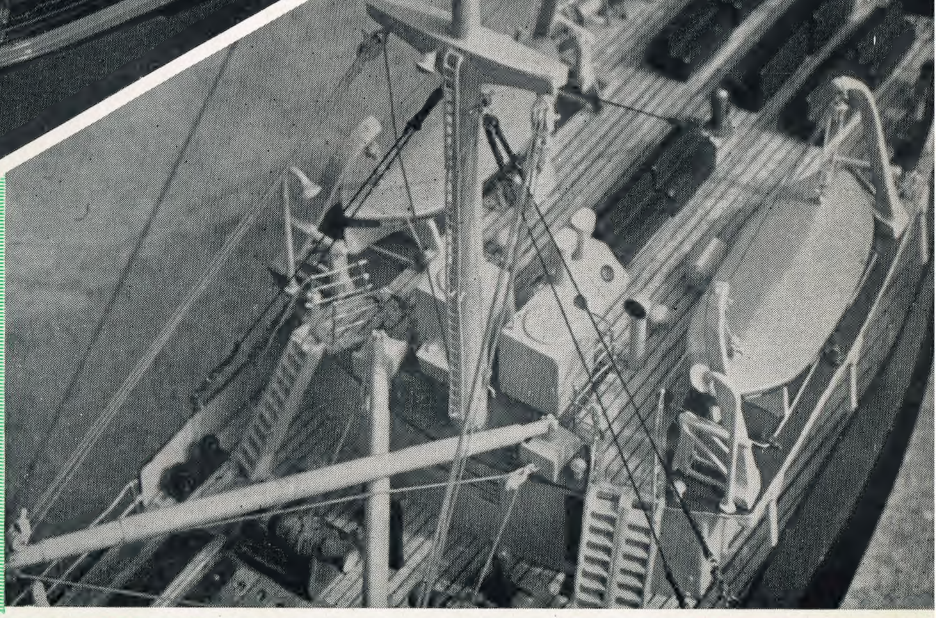
Model Engineer

THE MAGAZINE FOR THE MECHANICALLY MINDED





A WORKING MODEL OF THE MOTOR-VESSEL LAIRDS LOCH

ONE SHILLING 29 AUGUST 1957 VOL 117 NO 2936

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A WEEKLY COMMENTARY BY VULCAN

WESTMINSTER looked its summer best and the statue of Abraham Lincoln, with the sun shining on it, seemed eerily alive. Geoffrey Snow of Erith in Kent, a 16-year-old student at Gravesend School of Art, had been sitting on the front steps of the New Horticultural Hall since 8.30 a.m. He was perfectly happy. "This exhibition," he said, "is worth the journey and the wait."

Beside him, equally happy, sat 12-year-old Colin Smith, a pupil of Tottenham Grammar School. When the exhibition opened at 11 o'clock, these two were the first past the turnstiles, leading the long, patient, eager queue for the first day of the 32nd Model Engineer Exhibition.

The Earl of Northesk, who declared the show open, was introduced by Mr Kenneth Garcke, chairman of Percival Marshall and Company, as one of the leading model engineers in Britain and the president of SMEE.

Speaking of the long friendship between SMEE and MODEL ENGINEER, Lord Northesk said that they were both the brain-children of that very remarkable personality the late Percival Marshall.

Happy association

"I am sure," he added, "that Percival Marshall would have been delighted to see here today further evidence of the close and happy association of the paper and the society, in that I have been invited as president of the latter to open the exhibition organised and sponsored by the former."

After formally opening the show by switching on the lights of the full-size railway signals which dominated the hall, Lord Northesk took half a dozen delighted boys and girls for a couple of return trips along the SMEE track, driving a model North Eastern locomotive built by the club in 1928, nearly thirty years ago. I remembered, as I watched among the crowding photographers, that SMEE locomotives had run at the very first ME Exhibition in 1907, to the marvel of many who had never before seen a model railway engine working under steam.

If Lord Northesk showed that he could command a model locomotive with the easy assurance of a veteran (for even to drive along a 100 ft track needs the skill of experience) he also proved, in what he had to say, his intimate knowledge of the modelling movement.

The regulars

Those who came to the exhibition year by year were accustomed, he said, to make straight for the exhibits which particularly interested them, and then to continue their trip around the hall, visiting each stand in turn—for there was something on all the stands to interest everybody.

Many models reappeared annually and regular visitors like himself welcomed the chance of seeing these masterpieces once again. This did not

Smoke Rings . . .

mean that there was no variety or change—far from it! Every year there were many new and interesting models to be studied and criticised—for all model engineers criticised each other's work in a friendly way, more, possibly, than any other body of men he knew.

"The variety of this exhibition," the earl continued, "is always ensured by the enormous care and trouble which the organisers take to provide at least one new item each year, and this year, as an example, we have the beautiful ship models which have been brought over by some of our modelling friends from Russia."

After being warmly welcomed by Lord Northesk, the Russian modellers—Alexander Bliznakov, Alexander Vicherov, Alexander Veselovski and Jalal Yusupov—all members of the Central Marine Club in Moscow—asked Mr Garcke to accept a magnificent silver cup which they had brought with them from the USSR as a trophy for modellers in Britain. They also said that they would like to present pennants to two British clubs.

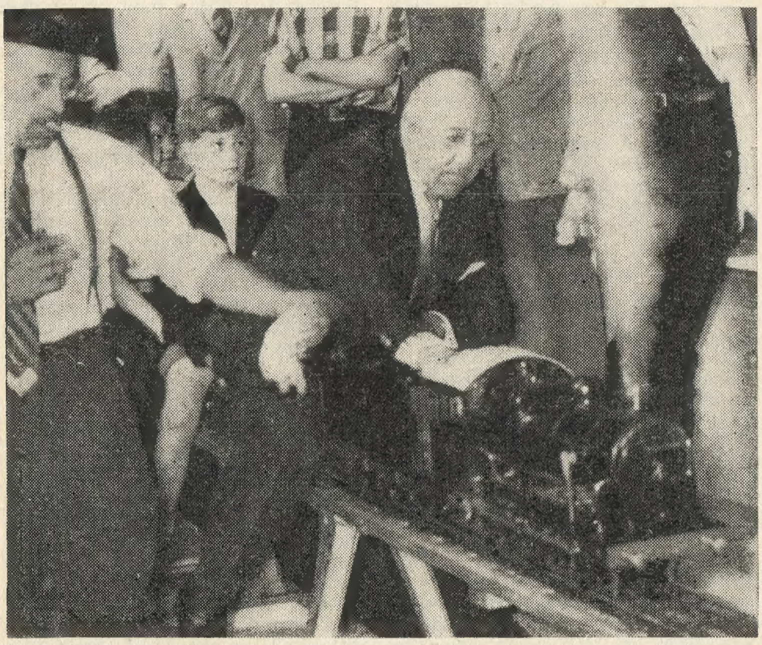
"And, of course," Mr Bliznakov told me, "we want some of you to visit our international modelling exhibition in Moscow next year."

Mr Kenneth Garcke receiving the cup, presented by the Russians, from Alexander Bliznakov

Missed own show

It astonished me to learn that Mr Bliznakov, who is director of the Marine Club and, therefore, a great figure in the Russian modelling movement, had come to London while his own exhibition was on.

If he and his three comrades are typical of the Russian people there can hardly be any doubt of the ordinary Russian's desire for friendship with the people of Britain. And certainly there can be no doubt whatever of the Russian genius for modelling, as illustrated by their delightful ship models.



Lord Northesk driving a locomotive on the SMEE track

Form-filling

IN recent years the British have been described as "a nation of form-fillers," and in some respects the term is fully justified; but many competitors in the ME Exhibition do not seem to have attained any great proficiency in the art. Despite the pains taken to make the entry forms as simple as possible, the information given on many of them was vague or ambiguous. In a previous exhibition, one of the entrants, under the heading "Description of model" wrote, "It hardly needs any!"—to which the obvious retort is "Comment is needless!"

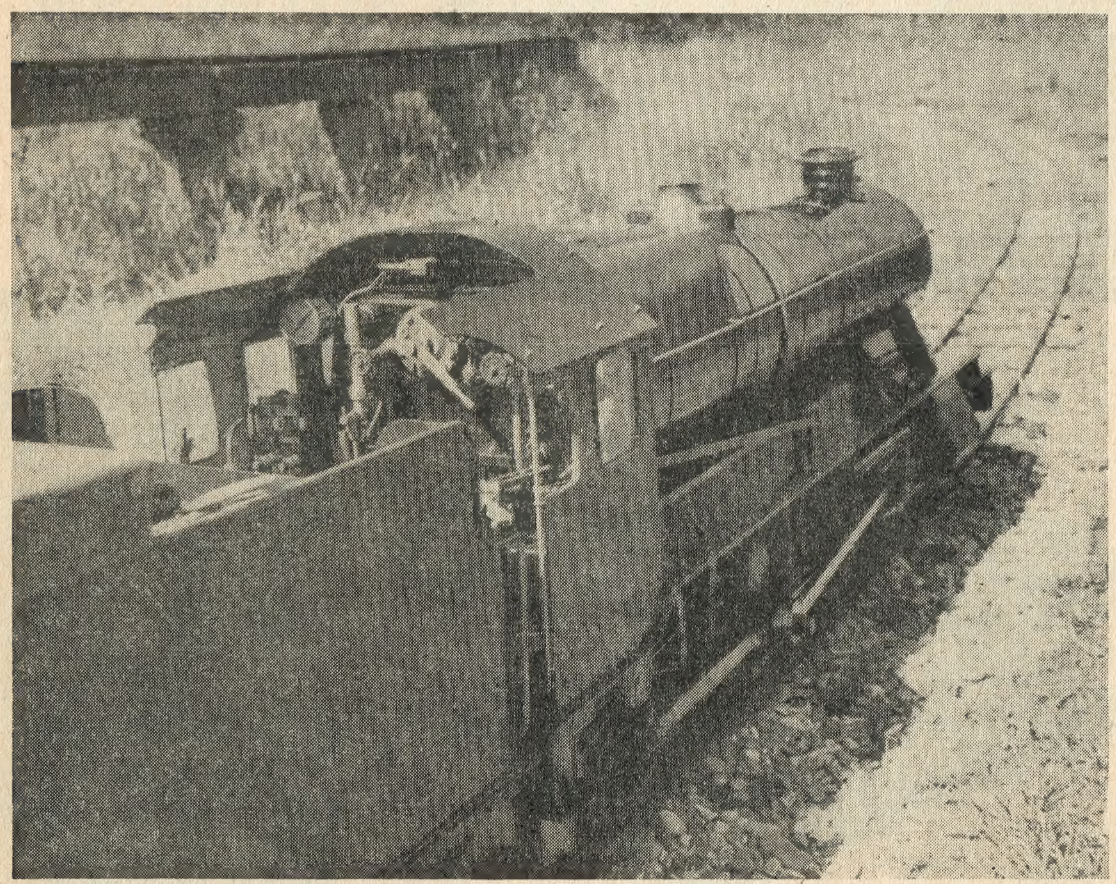
Cover picture

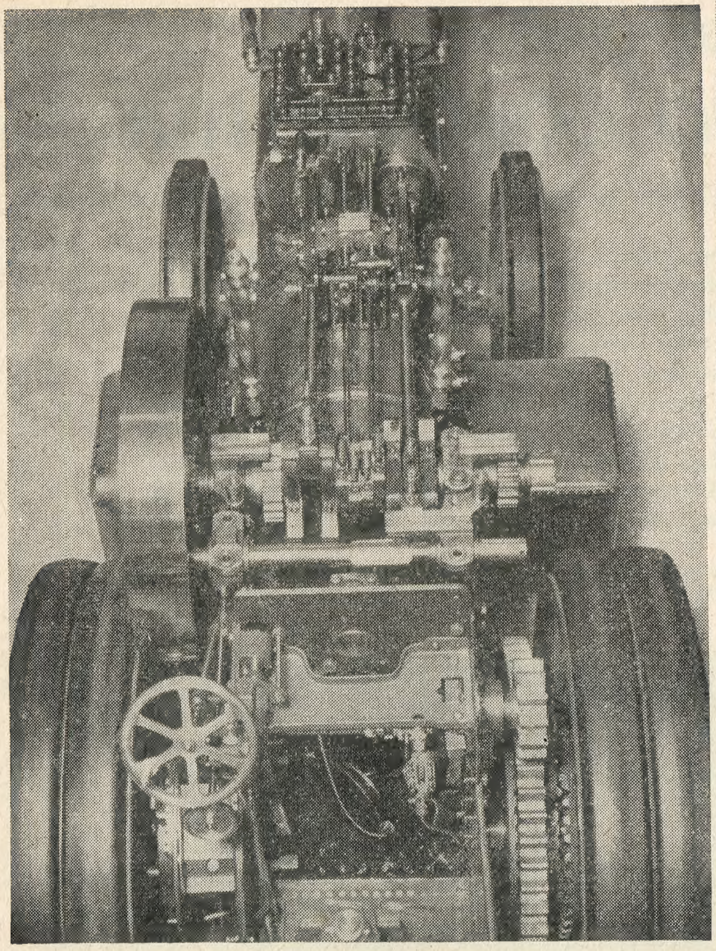
Two views of D. W. Greenslade's LAIRDS LOCH, *about which he writes on pages* 312 *to* 314. *This working model, which is over* 4 *ft long, is powered by two Bassett-Lowke marine electric motors which actuate contra-rotating screws* $1\frac{3}{4}$ *in dia.*

WINNERS of the ME PHOTO COMPETITION

Taking pictures of inanimate objects like model locomotives and traction engines does not give much scope for dramatic effect and human interest yet many of the competitors of the large number who entered succeeded in getting away from the hackneyed approach. The panel of judges finally decided that G. J. Smith's entry of a $7\frac{1}{4}$ in. gauge County class locomotive merited the first prize of £10. Apart from its being a good picture, the attempt showed imagination in choice of viewpoint and lighting. Second prize, £5, went to E. V. Harris, of North-west London, for his picture of a model road locomotive; and third prize, £3, to D. H. Jennings, of Neath, for his photo of a ship winch to 1 in. scale.

Below: The first-prize winner, entered by G. J. Smith, of Sussex. A selection of the entries will be on show at the Model Engineer Exhibition





Above: *D. H. Jennings, of Neath, took this picture of the 3½ in. gauge County class built by Fred Tawton, Pontypool*

Left: *The second-prize winner, " Bird's Eye View," was taken by E. V. Harris*

Below, left: *This entry of a model ship winch secured third prize for D. H. Jennings. J. P. Williams, of Cardiff, built the winch from scrap*

Below: *A. Beaumont used 1/5 sec. at f.22 for this shot of a model tugboat*

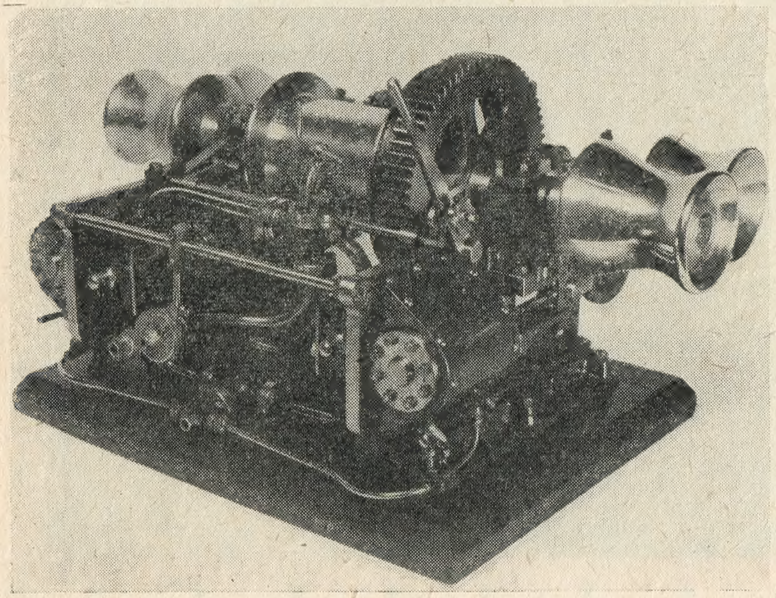
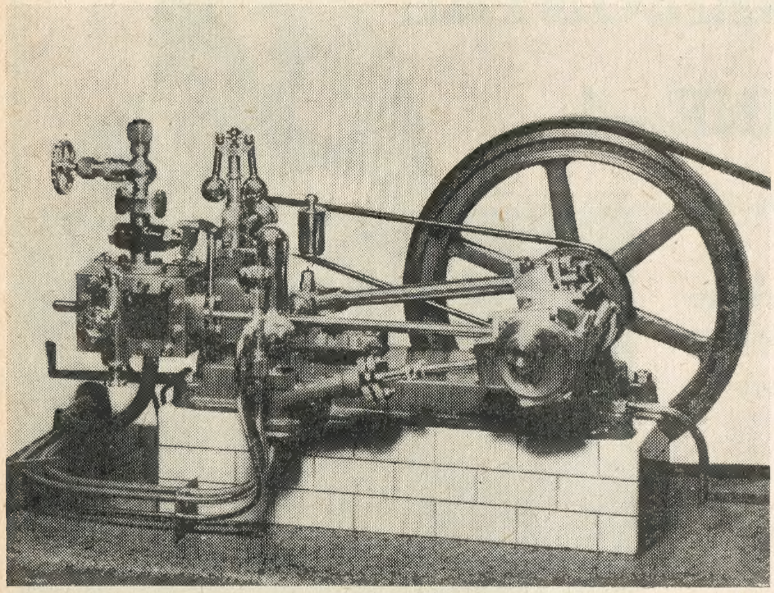
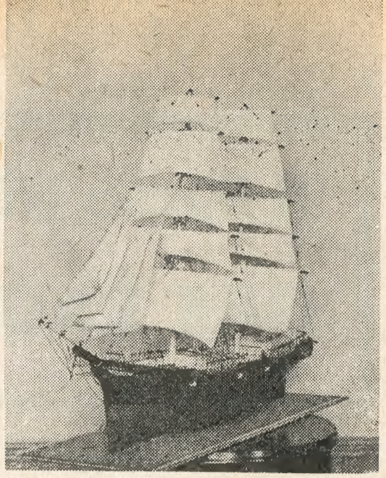


Photo competition —— continued

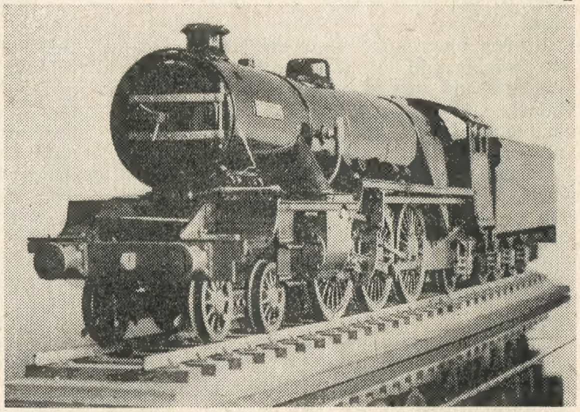


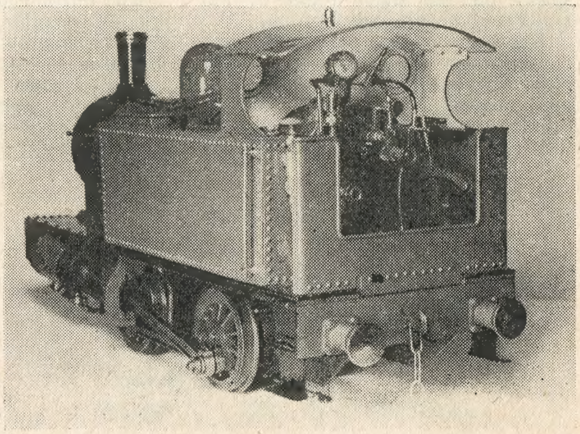


Above: *An exposure of* 18 *sec. at f*.22 *was needed for this photo of the model* MARIE SOPHIE. *George Turner, of Birmingham, entered it*

Left: *Another entry by A. Beaumont was this picture of a model Unicorn steam engine. Exposure*, 40 *sec. at f*.32

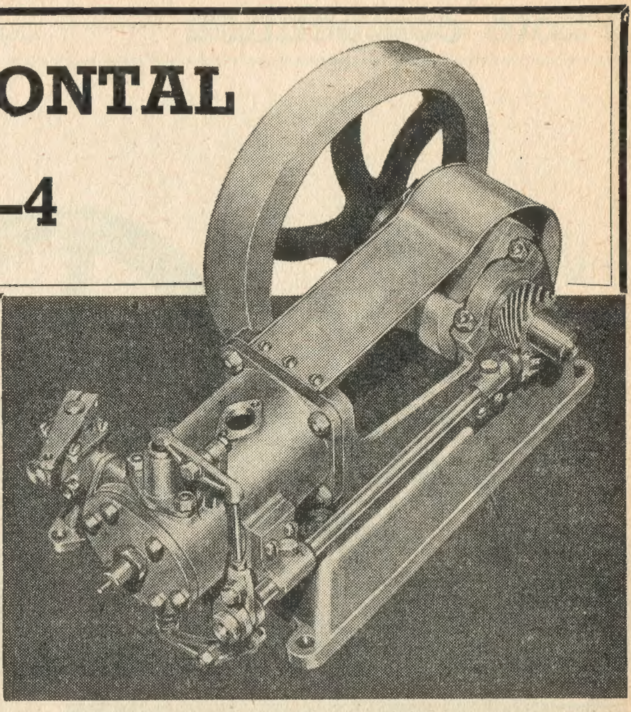
Below: *Thomas H. Walker took this picture of a* 3½ *in. gauge Pacific which he has rebuilt and re-boilered*





Above: *This* 0-6-0 *tank has its own lighting set. Photo by W. J. Prescott, of Ealing, Right*: *D. H. Jennings also entered this photo of* JULIET, *built by Mr A. Hiscock*

A 60 c.c. HORIZONTAL GAS ENGINE—4



EDGAR T. WESTBURY discusses the construction of the crankshaft, flywheel, bearings

Continued from 15 August 1957, pages 226 to 228

In previous articles dealing with steam engine construction, I have described methods of machining circular-section steel connecting rods, and the type employed on the Neptune diagonal paddle engines is practically identical to this one except in dimensions.

I have always recommended that the forming and the cross boring of the little end should be done before reducing the shank of the rod to its final tapered form, due to the difficulty of mounting it accurately; if the rod is turned from either round or rectangular bar, however, these operations can be carried out first, when it is quite easy to clamp the bar squarely and securely, either on the face plate or the vertical slide, according to the method of cross boring which may be preferred.

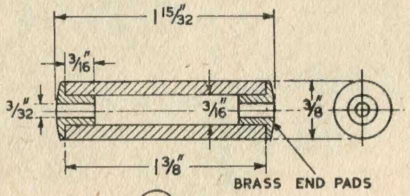
The main operations on the rod can be carried out between centres; the foot end should be counter-bored to form a register for the location spigot on the inner brass of the crankhead or big end bearing.

This bearing (part No 12) is most conveniently made from a solid piece of gunmetal or bronze. As it needs machining all over, there is little advantage in using a casting, which would probably present chucking difficulties in any case. A cast piece of rectangular bar large enough to clean up $1\frac{1}{4}$ in. × $\frac{3}{4}$ in., however, will be found most useful, as the two halves of the bearing can be machined on their end faces and parted off while the bar is held in the four-jaw chuck. The inner half should be spigoted to fit the recess in the foot of the rod, and, if desired, the two bolt holes may be drilled before either piece is parted off, as this will ensure beyond doubt that they line up properly. It should be noted that the bolts are made a snug dowel fit in the holes, no clearance being allowed; this applies also to the corresponding holes in the foot of the connecting rod.

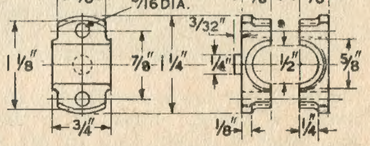
With the two halves bolted together, it is now possible to hold them in the four-jaw chuck for boring and facing. The size of the bearing makes it somewhat easier to handle than the small steam engine bearings which I have described recently. There is, however, much to be said in favour of adopting the machining methods I have recommended for the crankheads of these engines, namely by attaching them first to the rod and locating the little-end on an aligning mandrel attached to the lathe faceplate.

Alternatively, some constructors may prefer to do the job in reverse by machining the crankhead bearing, attaching it to the rod, and machining the little-end last, using similar methods of location. The essential thing is to ensure that the two bearings are exactly parallel to each other and any method which produces this result is "correct practice."

The little-end bearing should preferably be bronze bushed, but if the gudgeon pin is case-hardened, and fully floating—that is, free to rotate in the piston bosses—it will run for quite a long time without undue wear. A hard-surfaced gudgeon pin (part No 10) is desirable in any case, and soft end pads of brass or light



GUDGEON PIN (10) 1 OFF M.S. C.H.



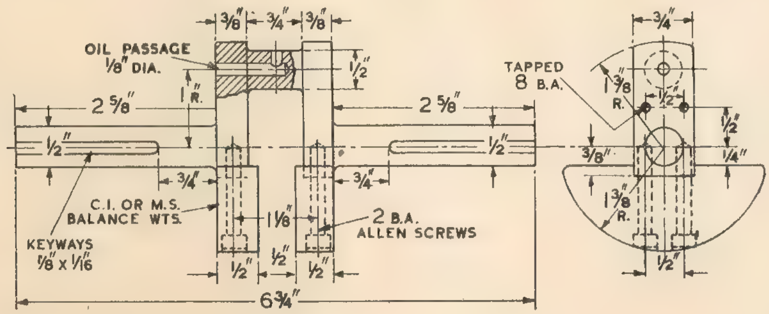
(12) SPLIT CRANKHEAD BEARING 1 OFF BRONZE

alloy should be press-fitted in the ends as shown, to prevent the risk of scoring the cylinder walls if it should move endwise.

Do not use silver steel for this pin, as it is too soft for durability if left in its normal condition, and too brittle if hardened. The essential need is a hard surface and a tough core. It should be slightly on the tight side when initially fitted to avoid little-end knock.

CRANKSHAFT

No pains should be spared to make this highly important part (No 11) as accurately as possible. There are many ways of making a crankshaft, and I think I have described pretty well all of them in connection with the many types of steam and i.c. engines I have designed. However, many fallacies are held with regard to crankshafts, and I have seen several shafts spoiled through errors in setting out or machining—usually by trying to take short cuts in either procedure. For marking out and centring a forging or solid bar, prior to machining between centres, there is nothing to beat the long-established methods, using the scribing block and surface plate to mark both radial and throw centres on both ends of the component, then carefully centre-punching the intersections of the lines and centre-drilling.



CRANKSHAFT (11) 1 OFF M.S.

Either black or bright rolled mild steel bar may be used, the finished size over the webs being 1¾ in. × ¾ in., but if cleaning up is necessary it will not matter if the webs are very slightly undersize. The bar should be normalised, by heating to dull red and allowing to cool slowly before marking out, otherwise it may be found that machining will release stresses, resulting in the finished shaft going out of truth, either at once or later on.

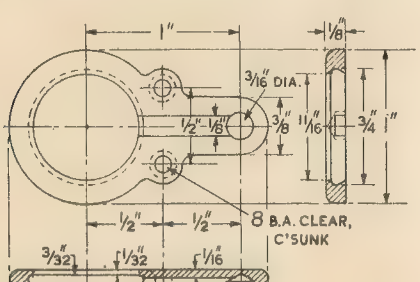
Crankshafts built up by brazing are quite satisfactory if the work is properly carried out so that full penetration of the joints is ensured. Attempts are sometimes made, however, to avoid the need for machining the journals after brazing, but apart from the fact that finish may be impaired by scaling, or superfluous spelter may be left in the region of the joints, there is more often than not some distortion caused by local heating.

Special brazing processes, such as Birlec furnace brazing, will eliminate these risks but these processes are not readily available in all cases. In the circumstances, machining after brazing may be considered the most satisfactory method and little time is saved by fabricating the shaft. There may, however, be some saving in material, which is no small consideration these days. I do not recommend fabrication by welding, as my experience of welded crankshafts has not been very fortunate.

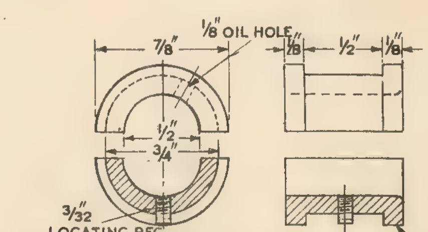
Full-size engines usually have attached balance weights of cast iron, and I have followed the same practice here, though some constructors may prefer to turn the shaft from large diameter round bar with balance weights integral; apart from the greater amount of machining work and waste of material, there is no objection to this. However, the separate weights are quite satisfactory if carefully fitted to the web, and properly secured.

I have suggested the use of sunk Allen screws for this purpose, but I have used mild steel screws, in engines running at quite high speeds, without encountering any trouble. An alternative method, for fabricated shafts, is to make webs and balance weights integral, as in the Unicorn steam engine.

For effective lubrication of the crankpin under continuous running conditions, some means of supplying oil from the inside is highly desirable, and the established method is by means of a centrifugal lubricator, or



BANJO LUBRICATOR (30) 1 OFF L.A. OR BRASS



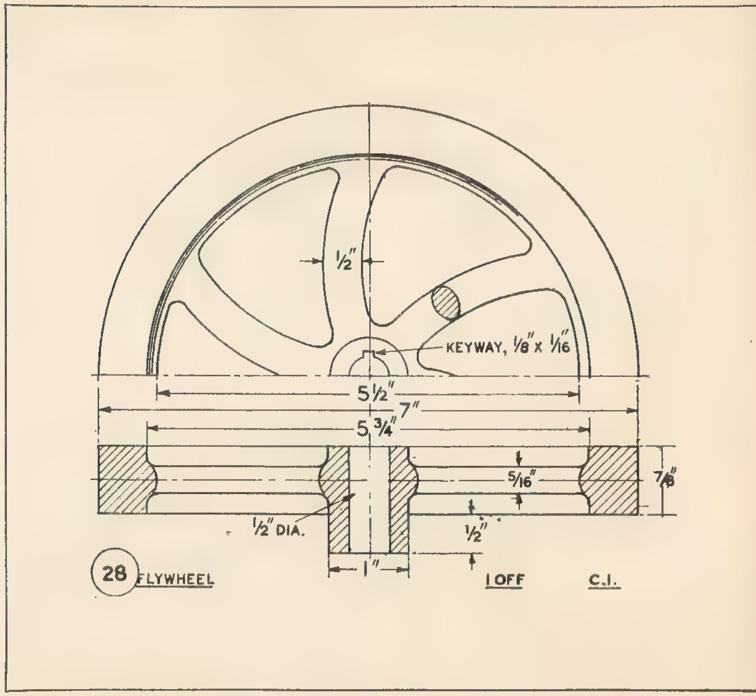
(3) MAIN BEARING 2 OFF BRONZE

NOTE: INNER FLANGE OF L.H. BEARING TURNED DOWN TO 11/16" DIA. TO FIT BANJO

banjo, which leads oil either from one of the main journal bearings, or a separate oil feed, radially outwards to a passage drilled in the crankpin.

This device (part No 30) may be cut out of sheet brass or duralumin, and attached to the side of the crank web by two screws. It does not matter greatly which main bearing it feeds from, but the timing side is usually preferred. The annular collecting channel should be slightly undercut, and the radial passage may be either milled, planed or chipped out. A close-fitting joint should be made between the banjo and the web to avoid oil scattering; a smear of joint varnish should be sufficient, but a thin paper gasket may be fitted if desired.

Keyways are cut in the shaft, either by end or side milling, or planing, to locate the flywheel and timing pinion, unless alternative methods of securing these, which will be referred to later, are adopted. I have shown the keyways at right angles to the plane of the crankpin, but their exact position is not important, so long as other parts are located to suit. They must be accurately cut, with smooth, parallel sides, as the fit of the keys is most important.



MAIN BEARINGS

These bearings (part No 3) may be made from cast bronze stick and, for preference, I recommend a relatively soft bronze, such as lead bronze, which is not only easier to machine than hard bronzes but also wears better in conjunction with an unhardened shaft. Machining split bearings can be a rather tricky business, but the job can be very much simplified by exercising a little forethought.

I recommend using a piece of material long enough to make both bearings with parting allowance, and holding it in the four-jaw chuck, from each end in turn for rough boring and machining, leaving ample metal on the outside to allow for splitting, either with a hacksaw or a circular saw in the lathe. The cut faces are then machined or filed to bed together dead truly and the two halves are temporarily sweated together under pressure.

After re-chucking in the same way as before, as truly as the altered shape will permit, the first bearing can be finish-bored and machined externally. To set up for dealing with the second bearing, a split bush should be made to fit over the waist of the finished bearing, thick enough to clear the flanges and take the thrust of the chuck jaws without risk of damage to the machined surface. After parting off and facing, but before unsweating, the bearings should be marked on the flanges to identify them for pairing and location.

When turning the outside diameter, some difficulty may be experienced in determining the exact size to fit the housings as they cannot be offered up in the usual way. The solution is to turn up a piece of scrap material to serve as an improvised plug gauge, its diameter then being measured with the "mike" and the bearing turned to correspond. Similarly, another piece can be turned with flanges to gauge the exact width of the housing, so that the bearings may be made a snug fit without end play; the bearing caps are, of course, removed for fitting operations.

If machined correctly, the half-bearings should fit the housings so that when the marking agent is applied, they are seen to make contact all over, and take quite an effort to move. It will then be possible to drill the hole for the locating peg in each bottom half, and continue it into the housing.

Incidentally, the bearings are large enough to allow of increasing the shaft diameter to $\frac{5}{8}$ in. should this be considered desirable; but the $\frac{1}{2}$ in. shaft is strong enough to stand up to any fair usage which the engine may encounter.

FLYWHEEL

This part (No 28) is, of course, a face-plate machining job, but it will be found very helpful to interpose a disc of wood between the casting and face plate to act as a shock absorber and reduce the tendency to chatter. Clamping plates may be fitted to bear across the spokes, but care should be taken to avoid bolting up so tightly as to strain them; this should not be necessary, as the wood backing will assist the grip.

For the first operation, the flywheel should be mounted with the projecting boss outwards, and it can then be faced and bored, machined on the outside of the boss, rim faced on one side, and the outside diameter turned, at one setting. It is only necessary then to reverse it for facing the other side of the rim. A thicker backing with a recess in the centre, or packing pieces to enable the boss to clear the faceplate, may be necessary for this operation. It is not usually possible to get a good finish on a spoked flywheel of this type by locating off the bore, on a mandrel, as it does not provide a rigid enough support.

The flywheel must be a really good fit on the shaft, and the key must also fit the sides of the keyway in both parts, but not excessively tightly top and bottom. An alternative method of fitting is by means of a tapered collet, such as I have used on many types of petrol engines—on no account should a grub screw be relied upon, except as a *supplement* to a properly fitted key.

● *To be continued*

BEGINNER'S WORKSHOP

UNIVERSAL JOINTS

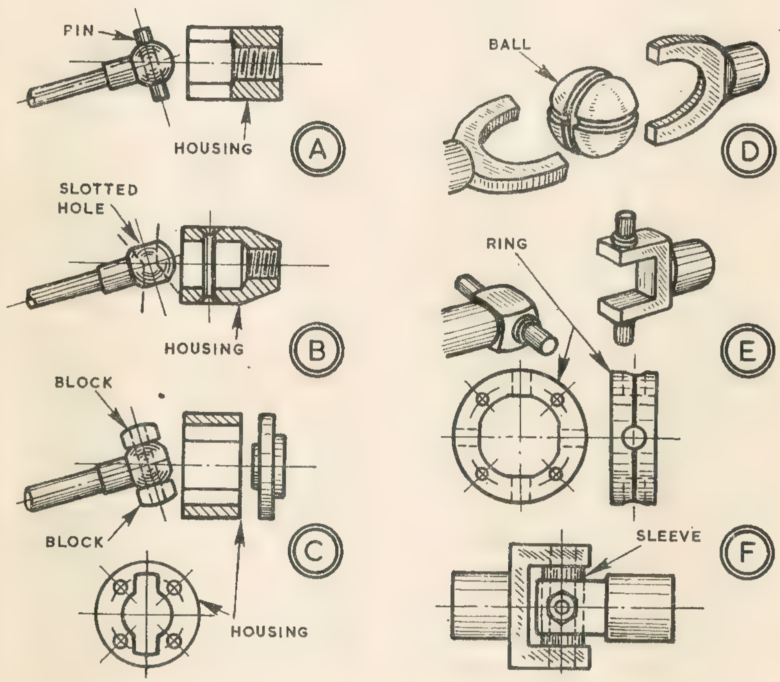
By GEOMETER

LIKE a flexible coupling, a universal joint transmits drive between shafts disposed at an angle, but has advantages of compactness and strength, since it is entirely of metal. Not depending on the flexibility of any of its members, but sliding or rotating contacts, it is able to work with reasonable durability at considerable angularity, and according to requirements can be arranged in a variety of ways.

A simple universal joint, as at *A*, consists of a ball on one shaft, a housing on the other, the ball carrying a cross pin, and the housing being slotted to accept it. The weak part of such a joint is the line contact between the round sides of the pin and the flat edges of the slots. This in conjunction with the combined sliding and rotating movement can give rise to fairly rapid wear. Nevertheless, the joint is a useful one in small sizes, with the housing of mild steel, case-hardened, and the pin of silver steel or cast steel, hardened and tempered.

A typical example is the propeller shaft drive for a boat, when the housing can be a type of nut screwed to the crankshaft, and the ball machined from bar stock, with a boss to screw to the propeller shaft, or to push on and be brazed.

If it is desired to " streamline " a universal joint—to work with less resistance to forward motion in water, the components can be arranged as at *B*. The ball is provided with a slotted hole, and the housing carries a fixed pin, which must either be soft enough to burr into countersinks or, if hard, short enough for the housing to be slightly burred over the ends—to prevent the pin slinging out. The slot in the ball can be made by " wringing " the drill carefully with which the hole has been drilled.



Cardan joint

The pin type universal joint which is mechanically correct in that it eliminates line contacts, and so possesses maximum durability, is the cardan joint, as at *C*. In this, the cross pin through the ball is fitted with a rectangular block each end. The housing is slotted for the blocks; and the action when the joint is rotating is a sliding movement of the blocks in the housing, and a rotary oscillating movement of the pin in the bores of the blocks.

The cross pin and blocks centre housing and shaft in one plane; and the blocks are curved on their outside edges to centre from the bottom of the slots in the other plane. For convenience when machining the slots, the housing usually has both ends open, and is bolted to a flange on the driving or driven shaft—otherwise, with one end closed, considerable difficulty would be experienced in producing true parallel-sided slots.

An ingenious universal joint, as at *D*, comprises a ball with a pair of grooves machined at right-angles, which are engaged by two flat-sided forks. Each fork can slide in its own groove, or twist the ball round in the other fork. This type of universal joint can be employed to operate the front brakes of cars—when the ball must be situated above or below the swivel pin axis, to prevent the action of braking affecting the steering.

Another type of universal joint is as at *E*. One shaft carries a cross pin at the end, and the other has a fork with two pins. A ring made in halves to bolt together has four bores at right-angles to enclose the pins. The bearing surfaces are large for the rotary oscillating movements.

A universal joint employing two forks can be arranged as at *F*. One fork carries a large cross pin and a sleeve. The sleeve is placed in the fork and the pin pushed through, and there is a central cross-wise hole through both to take a bolt which passes also through the other fork, and, fitted with a nut and lock-nut, completes the assembly. ■

AN OHV CYLINDER HEAD FOR THE ME SEAL

R. H. R. CURWEN suggests an amendment to this robust little engine that will step up performance

In the motoring world, a number of firms have specialised in the production of conversion units for the purpose of hotting up the performance of standard types of touring engines.

These have usually taken the form of a replacement cylinder head of high compression ratio fitted with large ports, modified gas passages, and other features normally found on the power units installed in sports cars.

I do not know whether such a comprehensive kit has been produced as would transform the humble side-valve engine into an overhead valve unit; but it occurred to me some time ago that such a cylinder head, if it could be made to fit the Seal, would be an interesting job to construct and might also provide some useful data on the performance of small multi-cylinder engines.

The working parts of the Seal are of ample strength to cope with any increase in power that might be expected, and, therefore, an o.h.v. head was drawn out which could practically be dropped into place on the engine.

A pattern was made and a casting obtained, but pressure of other work has prevented further progress; and, therefore, the drawings are offered of an untried design which will perhaps appeal to those petrol engine enthusiasts who may be casting around for something a little out of the ordinary with which to experiment.

I have not prepared working drawings of all parts, but I believe that sufficient details and dimensions are shown to enable the job to be completed without difficulty. The original intention was to leave the valve liners in place, and to operate the push rods via long tappets sliding in these. But while this arrangement would no doubt function, the side thrust due to the somewhat excessive angle of the push rods would cause wear, and so the removal of these liners is the only modification to be made to the standard engine other than the provision of a water outlet on the end of the cylinder block opposite to the inlet, for which a boss is already on the casting.

No attempt has been made to water-cool the head, and although this would have been difficult, I believe that air cooling will be found quite adequate. The area of the cooling surface is extremely large for an engine of this capacity, and is increased still further by the rocker mounting bracket which runs the full length of the head.

The standard Seal inlet and exhaust manifold is used and is bolted direct to the portface on the new cylinder head.

PORTING AND VALVE GEAR

It has been found necessary to reduce the diameter of the ports and passages to 7/32 in.; and to allow clearance for the push rods and still permit the use of the standard manifold, it will be seen that the passages must be drilled at two different angles.

It is also obvious that the marking out and drilling of the gas passages must be accurately carried out because the allowance for errors is small, and although a leak into one of the fixing holes would be unlikely to affect performance, a break through into a push rod aperture could not be tolerated.

To suit the reduced size of the ports, the valve heads are reduced in diameter to $\frac{1}{4}$ in., and the external diameters of the valve liners are also reduced to $\frac{5}{16}$ in. across the flange and 9/32 in. in the body. An additional 1/32 in. on the length of the valve stems as used in the side-valve engine is also advisable in order to allow a sufficient range of valve clearance adjustment.

The five fixing studs on the port side of the engine will not be required for the o.h.v. head, which is held down by the remaining ten studs; and the rocker bracket is also fixed, as shown, by the centre row of studs which, for this purpose, must be made $\frac{3}{16}$ in. longer than standard.

In the drawings, the rockers are shown in block form after cutting and machining from the solid, and while they could be used in this condition, they would be somewhat heavy for their job and could well be thinned down in the arms—a rather fiddly job on such small parts.

To enclose the valve gear, a cover could be fitted, as shown in the cross-sectional drawing, and fixed to the rocker bracket by a pair of knurled screws; but if the engine is embellished in this way, the cover should take the form of a tunnel with open ends to permit the flow of cooling air.

It would be worth while to enclose the original portface by a cover plate fixed by screws into four of the existing tapped holes, and on my own Seal the valve chest is fed with oil mist from the crankcase by two holes which were drilled for this purpose. Consequently the valve coverplate is essential to prevent oil leakage.

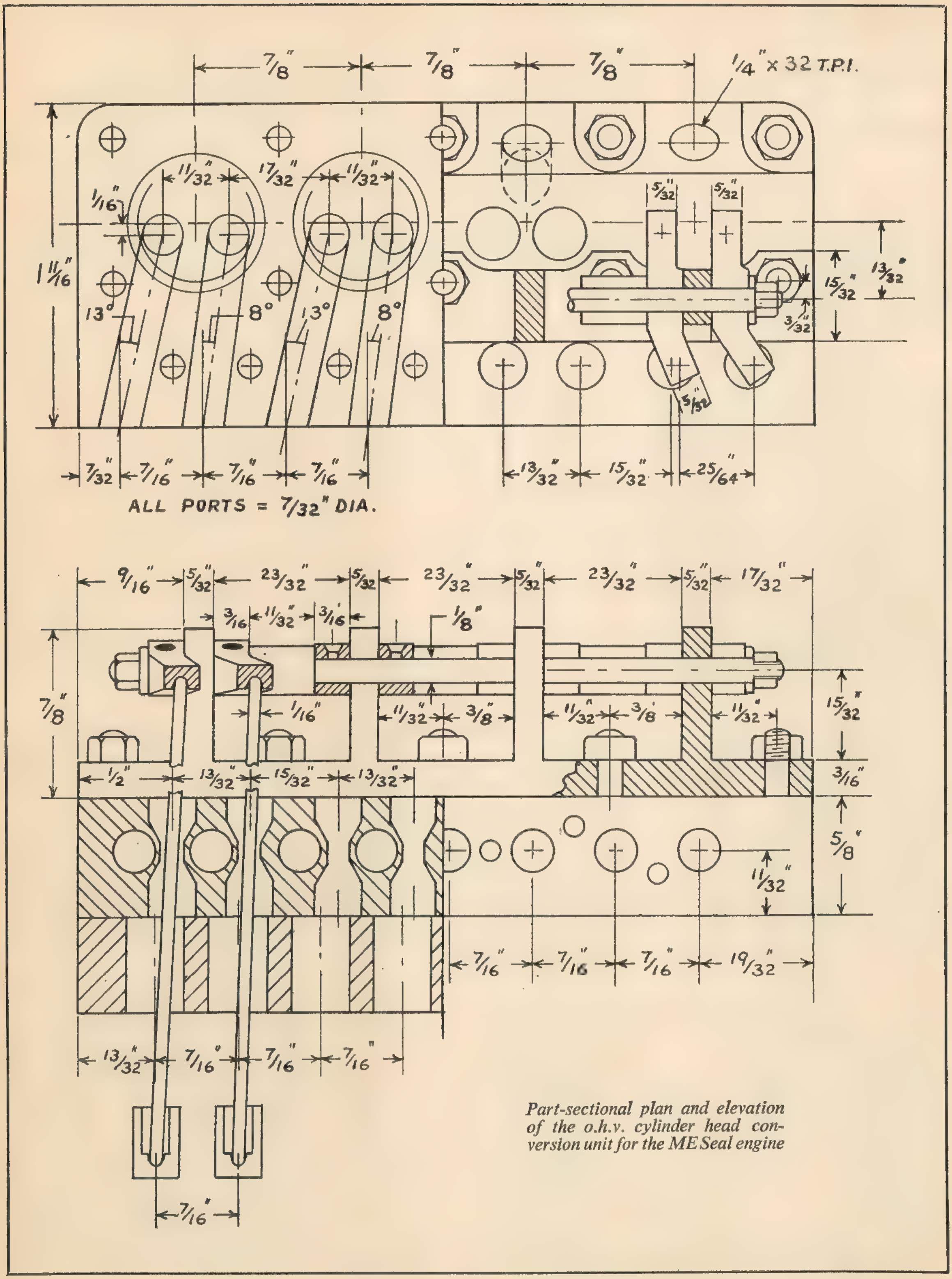
The existing tappets could be re-used after fitting with dimpled discs for the location of the push rods, but a little weight could be saved here by making a new set of tappets.

It is very likely that the o.h.v. job will peak at higher r.p.m.—as, indeed, it should do with a compression ratio, when made to the dimensions on the drawings, of about 8 to 1; and to prevent valve bounce, which would be caused by the increased mass of the valve gear, the valve springs should be stiffer than those in use on the s.v. engine. A compression of about $3\frac{1}{2}$ lb. for these will be sufficient.

Anyone who has successfully completed a Seal engine should find no difficulty in building the o.h.v. conversion unit for which the following brief notes on suitable materials and machining methods will be a guide.

CYLINDER HEAD

Either an aluminium casting or a rectangular block of duralumin can be used. In the latter case the angled faces for the sparking plugs and the pockets for the fixing nuts between them must be produced by milling, whereas with the casting only drilling and spot facing will be needed.



Part-sectional plan and elevation of the o.h.v. cylinder head conversion unit for the ME Seal engine

AN OHV CYLINDER HEAD

The clearance holes for the push rods can be formed by the use of a $\frac{1}{4}$ in. centre drill, and the upper face of the head must be machined flat to provide a true seat for the rocker bracket.

ROCKER BRACKET AND ROCKERS

On the drawings, this is shown in one piece, but to assist in the accurate alignment of the holes for the rocker shaft, it may be an advantage to divide this part across the centre fixing hole.

Here, again, either a casting or a section of duralumin can be used, and shim washers of a few thou in thickness should be inserted between the sides of the pillars and the rockers.

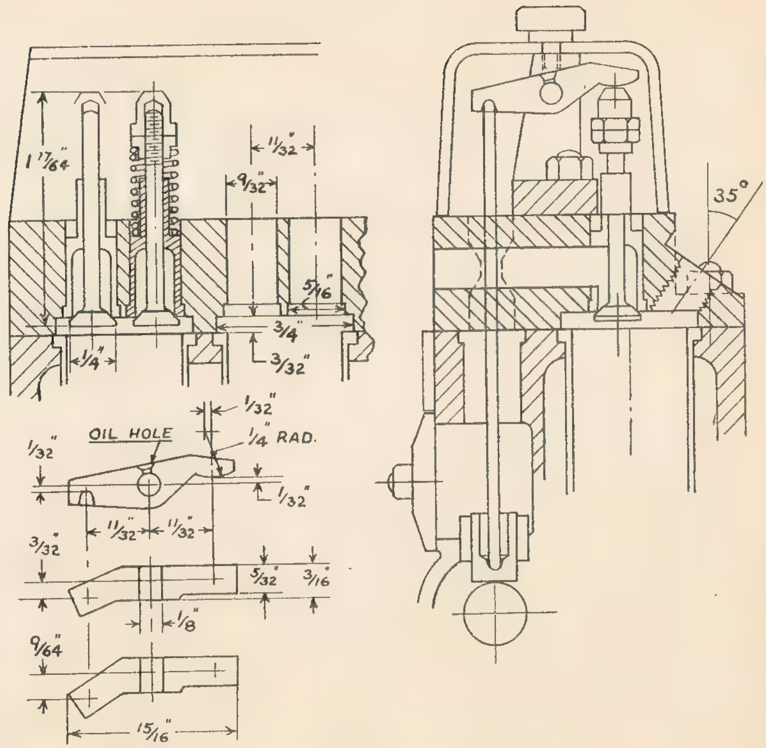
After cutting and machining from mild steel, the rockers should be well case-hardened, making sure that the hardening compound, during the "soaking" operation, covers all surfaces including the bores of the pivot holes.

It will be noticed that the rockers are of two types, one with an offset of 3/32 in. and the other with 9/64 in., and that four of each are required. Reading the plan drawing from left to right, rockers Nos 1, 3, 5 and 7 are of the 3/32 in. type and Nos 2, 4, 6 and 8 are of the 9/64 in. type.

A little reamer having a ball end and tapered flanks of 8 deg. included angle must be made for finishing the push rod locating dimples, both in the rockers and in the tappets; and this can be made from a stub of silver steel by turning the taper portion and carefully forming the ball end with a smooth file.

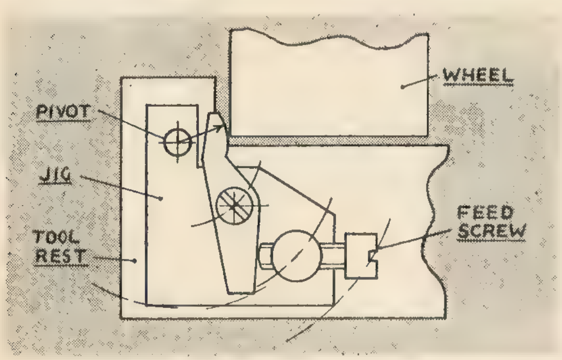
After filing away half the diameter the tool is hardened and tempered to medium straw colour in the usual way.

Quite a lot could be written on the ways and means of machining these small parts from the solid; and if end mills and a vertical slide are available, it might well save time first of all to machine a length of steel to the cross section of the rockers, from which they could then be cut off to shape by the use of a slitting saw.



Right: Cross section of cylinder head and valve gear. Top left: Section through valves. Bottom left: Detail of rockers

The radius which contacts the valve could be quite accurately finished by grinding on the side of the bench grinder with the rocker mounted on a jig as shown in the drawing.



Jig for grinding rocker end pads

PUSH RODS, AND VALVE CAP NUTS

Silver steel of $\frac{1}{16}$ in. dia. is suitable for these, and as it is essential that the rods be straight, I consider that no attempt should be made to harden the ends after they have been rounded and polished!

To prevent undue wear between the rocker pads and valves, it would be most advisable to case-harden and polish the caps.

Any of the main dimensions which have been omitted from my drawings can be taken direct from the Seal drawings, as care has been taken not to alter the fixing centres of any of the original parts.

In submitting this design, I am in no way suggesting that the Seal in its original form is lacking in power, and I think it will be agreed that the output of $\frac{1}{4}$ horsepower which is produced in such an effortless and silent manner is quite satisfactory for an engine of this type. ■

A THREAD DIAL

FOR CUTTING METRIC THREADS

on a lathe with an English leadscrew

By K. G. Anderson

FROM time to time I find it necessary to cut a metric thread on a lathe having an English leadscrew. Owners of Continental cars will doubtless have had this experience.

It is comparatively easy to set up the necessary train of gears if one has a 127 tooth wheel. But unless one is prepared to keep the half-nuts constantly engaged and return the saddle to starting position at the end of each cut—either by reversing the motor or turning the leadscrew with a spanner—it is not at all an easy matter to ensure that subsequent cuts will be in the correct position.

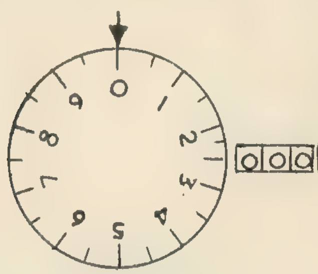


FIG. 1

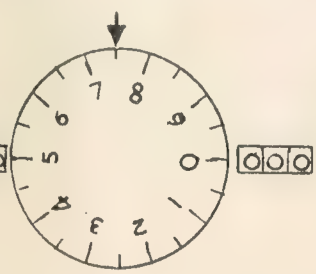


FIG. 2

FIG. 3

The thread dial I have planned and hope soon to construct will allow the engagement of the half-nuts as surely as when cutting British standard threads and with little more mental effort. Details of actual construction will vary from lathe to lathe but they should present no great difficulties. For this reason only the theory of the device will be given here; the constructional details will be left to readers' own discretion.

To simplify the explanation and to avoid too many Xs and Ys, let me assume that your lathe has a leadscrew with eight threads per inch (the modifications necessary for other pitches will be evident).

Now, for all practical purposes, 1 in. is equal to 25.4 millimetres or 5 in. = 127 mm. Therefore, if the thread dial pinion be made with 40 t., one revolution of the dial will correspond to 5 in. (= 127 mm.) movement of the saddle.

Next suppose the thread you wish to cut has a pitch of P mm., P may be less or greater than unity, and, in fact, may be any value divisible by 0.025. (Standard metric threads have all values of P divisible by 0.05.)

One revolution of the dial, corresponding to 127 mm. movement of the saddle, will thus correspond to $\frac{127}{P}$ threads on the workpiece. P revolutions of the dial will correspond to 127 threads on the workpiece, and, therefore, the half-nuts may be re-engaged P revolutions of the dial after taking the initial cut (or any multiple of P).

As the leadscrew can only be engaged by the half-nuts at each 1/40 revolution of the dial, it is evident that P must be some multiple of 1/40 (= 0.025) to permit engagement. For this reason only Nos 0, 1, 10, 13 and 18 BA threads can be cut with the aid of this device, the other BA pitches not being divisible by 0.025. The dial could be graduated with 40 divisions giving all possible engaging positions, but as the standard metric pitches are all multiples of 0.05, it is only really necessary to make 20 graduations (see Fig. 1).

So far, so good. Taking a particular case where $P = 0.75$ mm., the first re-engaging position (assuming the dial to read zero on beginning the first cut) will be as shown in Fig. 2. The next positions will be after 1.50, 2.25, 3.00, 3.75 revs of the dial and so on. Hence it becomes necessary, except in the special cases where $P = 1$ or $\frac{1}{N}$ (N being an integer), to have some means of counting the revolutions of the dial.

The simplest method appears to be to use an ordinary Veeder-Root type counter of the reversible type (to allow for backward movements of the saddle), preferably one with a zero-resetting device. The drive for this could be by means of pins on the dial shaft and a star wheel (cyclometer fashion) —or, better still, by a pair of small bevel gears.

A suitable engaging position for the 0.75 mm. thread is shown in Fig. 3.

I am sure that anyone who has a number of metric threads to cut and objects, as I do, to having to reverse the motor after each cut, will find this "gadget" a worth-while addition to his collection.

Left-hand threads can also be cut with the aid of the dial, but further slight complications are introduced.

If anyone is interested in further details I will gladly supply these in answer to a letter addressed to me care of the editor. ■

From North, South and West

Yes, it's news now of three more important exhibitions

SHEFFIELD

Reported by Northerner

THE combined exhibition of Sheffield and District SMEE, Sheffield SMS and Sheffield SAM was held at St Mary's Community Centre in conjunction with an art and crafts show.

Winner of the Open Championship Cup, the president's cup for best model by a Sheffield member, and first prize in its class, was the 1831 i.c.-engined locomotive by father and son—Fred and Ivan Law. This E. T. Westbury-designed locomotive was an excellent piece of craftsmanship and I look forward to seeing the engine when it is completed.

Ivan, now secretary of the local SMEE, also exhibited his nearly-finished *Hielan' Lassie*. This engine, I forecast, will do well in the future.

In the ship-modelling section, S. Davison secured well-earned top honours with his 1 in.-scale seagoing motor-cruiser *Cossack*.

This boat is based in appearance on American practice, and the 40 in. hull is plank built, then skinned with nylon which is resin-bonded to the hull. It is powered by a 3.46 c.c. water-cooled c.i. engine, with two-speed control as well as steering actuated by three-channel radio.

For his inch-scale version of the Broads cruiser *Corsair* on which he spent his last summer holiday, Arthur Winterbottom was awarded the SMS Trophy for originality. The model was a good representation, with folding canopy over the cockpit to clear low bridges; the hard-chine hull is powered by a 2.49 c.c. engine, and the steering is radio-controlled. Having seen both *Cossack* and *Corsair* on the water, I can testify that they both perform well.

Altered armament

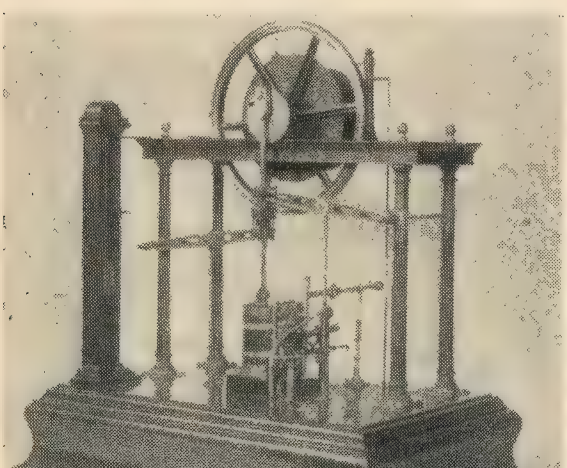
Another vessel I have enjoyed seeing at work is Derek J. Stamper's well-finished ½-in. scale Vosper MTB, which is also radio-controlled. This was built primarily to W. J. Hughes' drawings [available from this office]. Derek, however, has altered the armament to represent the second version of the prototype—when two torpedo tubes were removed and an automatic six-pounder gun was fitted. The hull is also covered with diagonal planks instead of plywood, as specified.

All the really excellent detail work on this boat was made from scrap material which, as Derek says, adds greatly to the interest of the kitchen-table worker. It also cuts down the cost !

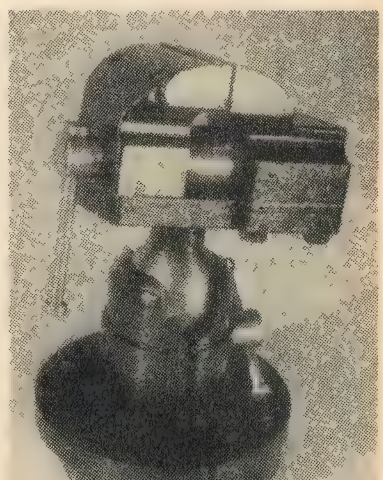
A handsome little model of a modern diesel-driven trawler won the Power Boat Trophy for A. F. Clayton. The model, however, was electrically propelled. The good finish and neat fittings were largely responsible for this award, but marks were lost by the deck planking being much too wide.

Bill Grange, though severely handicapped by ill-health, is building a freelance 3½ in. gauge 0-4-0 tank engine, of which the chassis is now complete. The cylinders are outside, but the Stephenson valve gear is between the frames, which have the old-fashioned sandwich-type buffer beams of wood and steel. Bill tells me that the motion runs well under compressed air, and he is now looking forward to the boiler work.

Another 0-4-0 tank engine—but in 5 in. gauge—which has reached the

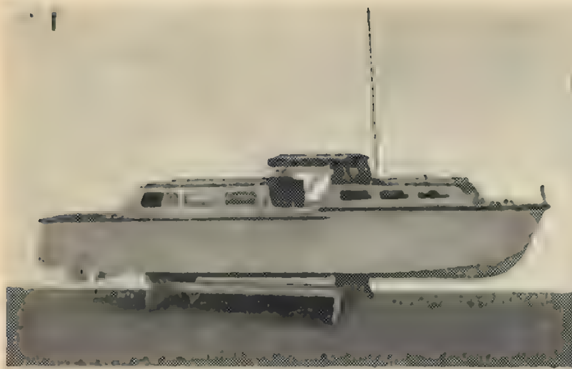


A model of an early nineteenth century colliery winding engine



An example of the ME Universal swivelling vice

1



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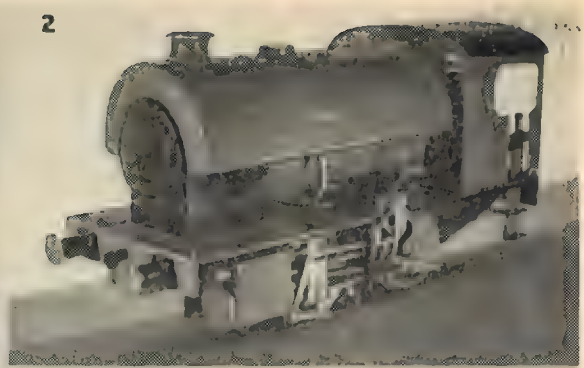

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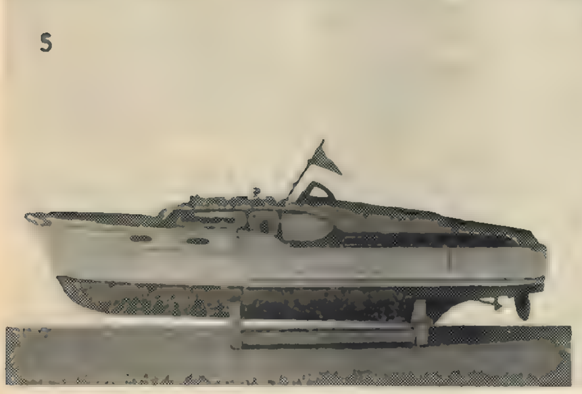

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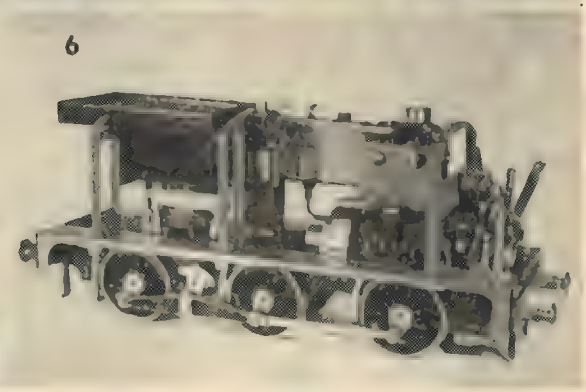


1 This model of a Norfolk Broads 4-berth cabin cruiser perpetuates holiday memories for Arthur Winterbottom ; 2 E. A. Barker, of Sheffield SMEE, built this 5 in. gauge saddle-tank which has Baker valve gear ; 3 Chassis of Bill Grange's 0-4-0 old-style tank engine. Note sandwich-type buffer beams ; 4 A first-class ½ in. scale Vosper MTB built by D. J. Stamper, of Sheffield ; 5 S. Davison's inch scale motor cruiser was awarded several prizes including a "1st" ; 6 Awards were won by Fred and Ivan Law with this fine example of an 1831 i.c.-engined locomotive

boiler stage was shown by club stalwart Reg Kerry, whose inch-scale 2-6-2 tank and LNER B1 were also on view. Reg is building the smaller locomotive as it will be easier to transport to the Blackgates track. (Sheffield SMEE, after 20 years of searching, still cannot find a site for a permanent one of their own.)

Edgar Brook is widely known for his vast knowledge of steam engines, past and present. He has taken thousands of feet of cine film of locomotives—and has a big library on the subject as well as a collection of models.

Two of these were on show. One was a horizontal mill-engine of about 1½ in. bore × 3 in. stroke, which had been built many years ago to demonstrate a patent method of controlling the feed-water to suit engine speed. Besides controlling the steam supply, the governor also actuated a curved slide by which the stroke of the pump-ram could be varied, in a similar manner to certain expansion valve gears.

The other model, also very old, represented a colliery steam winding

engine of early nineteenth century practice, with valve gear as used by Boulton and Watt on pumping engines *circa* 1780.

With a vertical cylinder driving upwards to the overhead crank and a parallel motion of the opposed lever type, the construction except for working parts is chiefly in mahogany.

This model must be unique, and Edgar is, indeed, fortunate to be its possessor.

VICKERS-ARMSTRONGS

Reported by J. N. Maskelyne

THIS year's exhibition, organised by the Vickers-Armstrongs (Weybridge) contingent of enthusiastic model makers, showed no signs of diminution of interest and keenness. The variety of the exhibits was commendable and the general quality high.

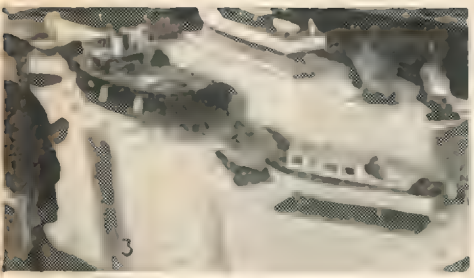
As is only to be expected, the aircraft section was particularly strong; but a noteworthy feature in all sections was the number of exhibits made by apprentices and younger members of the staff.

These young people will be the engineers of the future, and their work displays ample evidence of the thoroughness of their training and their ability to apply their knowledge.

Add to all this the friendly atmosphere met with in every section, the comment that it was a thoroughly enjoyable show seems superfluous.

1 *An excellent model of a first world war fighter plane*; 2 *A group of marine models*; 3 *These models represent three phases in motoring history*; 4 *Outstanding workmanship and finish characterise this radio-controlled* 10 *c.c. petrol-engined model cruiser*

Assembling a set of model galloping horses



Another view of the marine section at Cheltenham's show

CHELTENHAM

Reported by G. H. Lewis

MANY excellent examples of the work produced by Cheltenham MEC during the past year were on show at this West Country club's exhibition.

Almost every model was a working one, and prominent was a steam tug by C. Blazdell, of Norton. Taking him 12 years to make, the tug is exact to the smallest detail and incorporates a steam-generated feed pump, bilge ejector, windlass, electric light and steering.

W. B. and W. H. Holland showed a radio-controlled salvage tug *Electronic*, H. Sheere a scale model of a cabin cruiser, also radio controlled, and R. D. Mainwaring entered an excellent working replica of the Royal yacht *Britannia*.

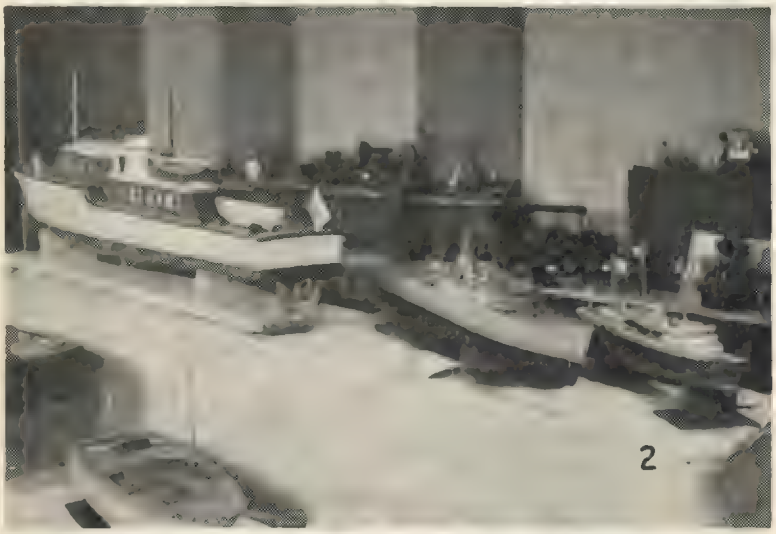
Among the land models were rail locomotives by H. Richardson and his son, Keith.

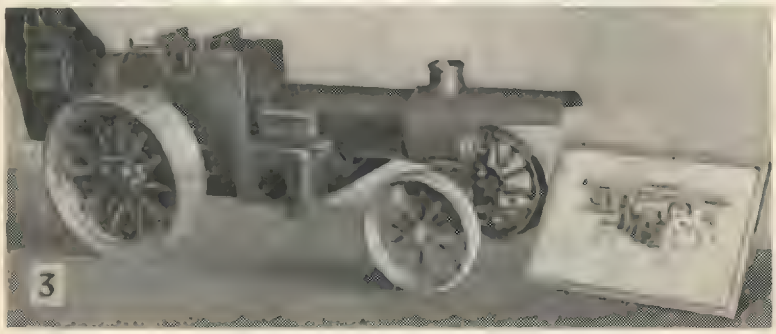
A centre of attraction was a model of an old-type Aveling road roller. A foot long and weighing 54 lb. it is able to pull a man seated on a wooden trailer. This was demonstrated successfully over a stretch of very rough ground.

It was interesting to see that this exhibition displayed nothing of the modern craze of streamlining. Some models had a direct leaning to antiquity, such as the old Cornish pumping machines, hot-air engines and the, as yet unfinished, 2 in. scale model of a Burrell double-crank compound 3-speed scenic road locomotive by L. Dobbs. Mr Dobbs estimates that the locomotive will take him another two to three years to complete.

The only non-working pieces on shown were 11 models of aircraft—imaginatively displayed—by one of the younger members of the club, Roger Cooke.

On reflection one was surprised but gratified to see the large number of ladies who attended the exhibition. They showed by their keen questions that model-making may not always be man's prerogative !

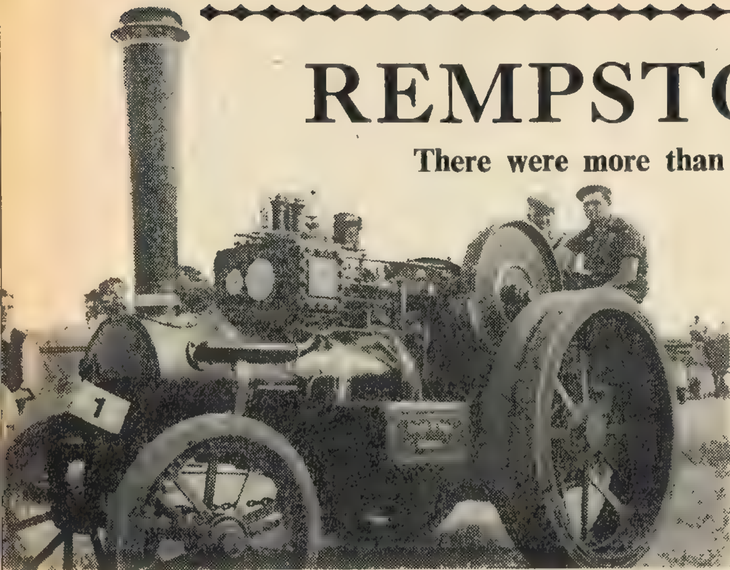




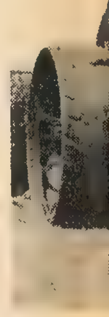
Right: 1 *The steam tug* ENTERPRISE *by C. Blazdell*; 2 *General view of the show*; 3 *A partly-finished 2 in. scale model of a Burrell road locomotive by L. Dobbs*

A model of a once famous type—the singlewheeler

REMPSTONE RALLY

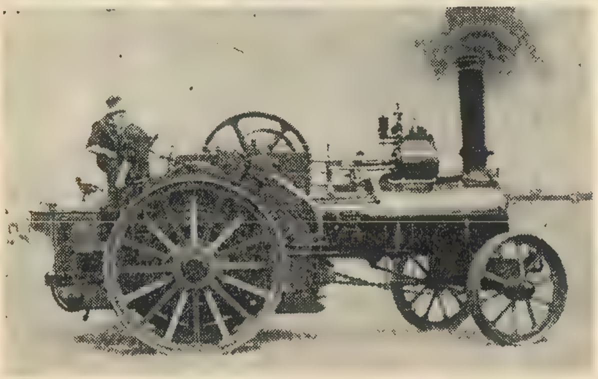


There were more than one hundred exhibits at this important South Nottinghamshire event. Northerner reports . . .



IT's the only way! I've been touching wood at every opportunity and keeping my fingers firmly crossed—with the result that every outdoor event I have attended this year has been held in glorious sunshine.

The Rempstone Rally was certainly no exception; the crowds were enormous, and because of that important factor a handsome sum was raised for the Blind Institution.



The most impressive exhibits were the two pairs of Fowler ploughing engines owned by C. Grice of Old Dalby and Beeby Brothers, of Rempstone, respectively.

The former were 16 n.h.p. compounds weighing 20 tons apiece, built in 1920, and the latter were 12 n.h.p. single-cylinder engines of 13 tons, built as long ago as 1886! The compounds won the Elegance Prize in this class.

During the afternoon one engine from each pair gave a demonstration of its tremendous power. Coupled back-to-back by wire rope each in turn hauled the other backwards round the field, the engine being towed having its ov
forward gear with the r
open.

Nearly as impressive
17½ ton Fowler show
Goliath (No 14424) o
and Ford, of Leicester.

This machine won t
ship Cup, and it was dif
that as recently as thr
was virtually a wreck

In direct contrast t
weights were the stea
which class the Elega
was awarded to R. W
o' the North, from Hett
Durham. This well-ke
been driven down du
along with the Foden
(No 13484) owned by
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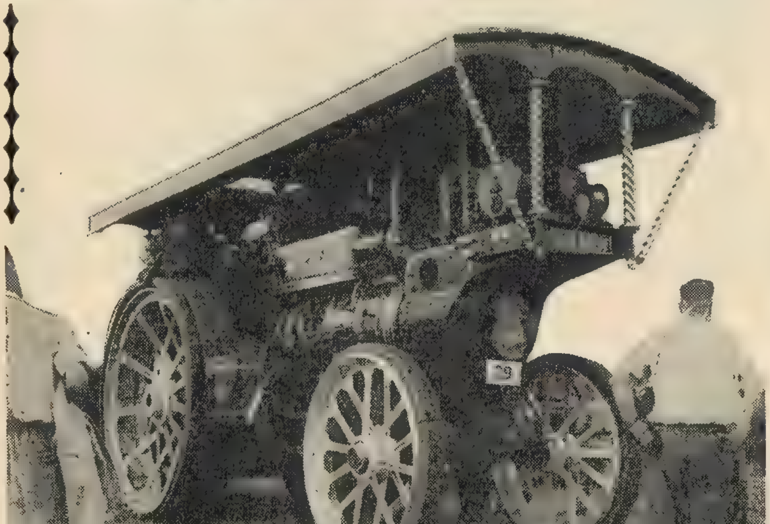
J. T. Beeby, of R
awarded the Elegance

Above: *R. Wakefield's* COCK O' THE NORTH



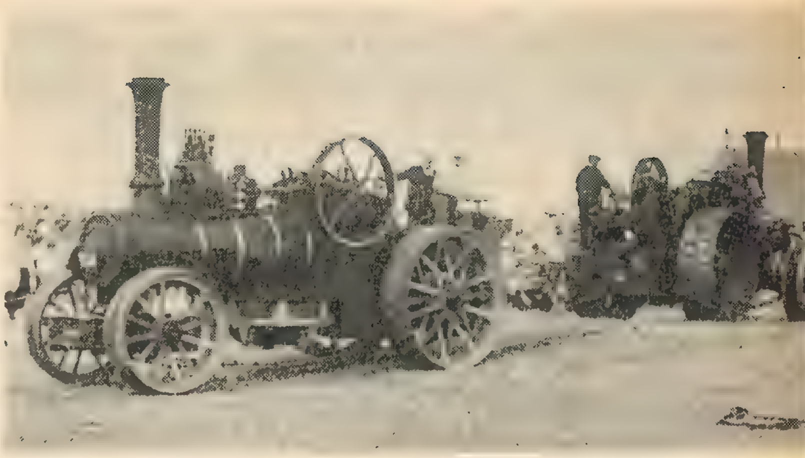
Centre: *The last traction engine built by Ransomes, Sims and Jefferies—No 42036—now owned by A. E. Sage and J. E. Ford, of Leicester*

Left: *The 17½ ton Fowler showman's engine* GOLIATH

Above: *One of the s*
12-50s in the parade.
Lizzie" is still goi
Model T Ford owned

Right: *Compound and single ploughing engines demonstrating their strength*

Below: *Alf Pepper with one of Grice's compound ploughing engines*



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akefield's *Cock*
on-le-Hole, Co.
ept Burrell had
uring the night
tractor *Revival*
Mr Wakefield's

empstone, was
first prize in

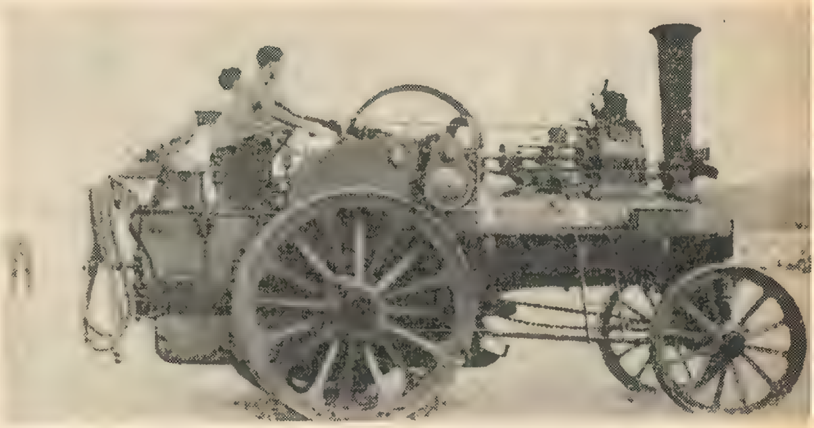
the traction engine class for his 7 n.h.p. Clayton and Shuttleworth No 44103, which was built in 1911.

Another handsome and well-kept engine was Sage and Ford's Ransomes, Sims and Jefferies No 42036 of 1932—the last built by this firm and the youngest present apart from the Sentinel wagons of 1934 and 1937.

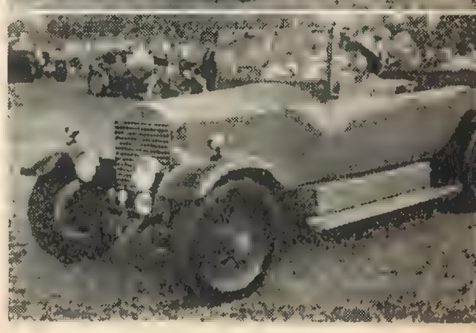
Among the vintage cars, as one would expect, were several Bentley and Rolls Royce vehicles, and the old 12-40 and 12-50 Alvis were well represented too.

Several Baby Austins, a 1919 Model T Ford (with left-hand drive) and a bull-nosed Morris Oxford were representative of the early examples of quantity production.

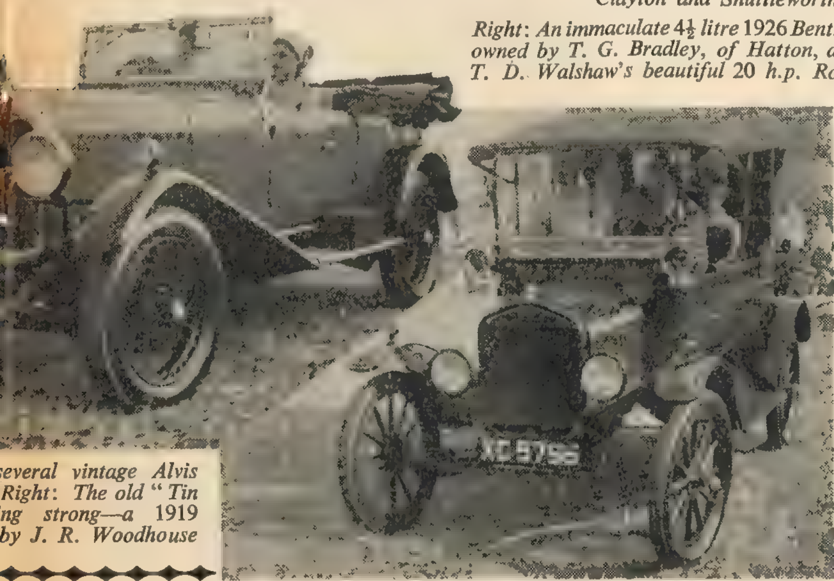
It was, indeed, a day full of pleasure, spectacle and incident, and the organisers are to be congratulated for an excellent job of work. ■



Above: *First prize in the traction engine section*; *J. T. Beeby's Clayton and Shuttleworth*



Right: *An immaculate* $4\frac{1}{2}$ *litre* 1926 *Bentley owned by T. G. Bradley, of Hatton, and T. D. Walshaw's beautiful* 20 *h.p. Rolls*



several vintage Alvis
Right: *The old "Tin*
ng strong—a 1919
by J. R. Woodhouse

ZOE

This week LBSC describes a mechanical lubricator that can be fitted below footplate level on this $1\frac{3}{4}$ in. gauge passenger hauling locomotive

Continued from 15 August 1957, pages 234 to 236

THE lubricator I am about to describe is more or less a "request item." In the ordinary course of events I should have specified one of my standard-size lubricators, which would have stood up above the running-boards when erected, and put a box cover over it. However, some builders object to this arrangement, preferring to keep the whole bag of tricks out of sight. So here are the details of a lubricator which will fulfil their particular requirements.

It would have been easy enough to reduce the sizes of the tank and pump of my usual pattern. But if this is done not only will the job be reduced to "watchmaking," but the gadget itself will become too small and fragile to be reliable. By adopting a diagonal position for the pump not only can a standard-size pump be used, but the only extra work entailed will be the shaping of the bottom of the stand—and that is easy enough.

To make the tank cut a strip of 20-gauge brass 4 in. long and 1 in. wide and bend it into a rectangle measuring $1\frac{1}{4}$ in. × $\frac{3}{4}$ in. Stand this on a piece of 16-gauge brass, a little larger, in the brazing pan, silver solder all around the bottom and at the corner joint and, after pickling and cleaning, file the bottom flush with the sides.

The lid can be made from a piece of the same material measuring $1\frac{1}{2}$ in. × 1 in. full. Snip a $\frac{1}{8}$ in. square out of each corner and bend $\frac{1}{8}$ in. over on all four sides to form a tray that will snap on to the top of the tank. The corners may be silver soldered, but use only enough to seal the crack otherwise the lid won't go on.

On one of the shorter ends at a bare $\frac{1}{8}$ in. from the top attach a $\frac{1}{2}$ in. length of $\frac{5}{16}$ in. × $\frac{1}{16}$ in. angle by a couple of $\frac{1}{16}$ in. rivets. At 7/32 in. from the top and $\frac{1}{4}$ in. from the end of one of the longer sides drill a $\frac{3}{16}$ in. hole, and in the end, at 9/32 in. from side and bottom, drill another.

THE PUMP

The stand calls for a piece of brass $1\frac{7}{16}$ in. long, $\frac{1}{2}$ in. wide and $\frac{5}{16}$ in. thick. This is sawn and filed to the shaped shown. When marking out take care to set the bottom angle exactly to 90 deg. and file to the line so that the angle fits nicely into the corner of the tank. The rebate for the crank and the clearance for the cylinder trunnion can be milled with a cutter on an arbor between lathe centres—if the stand is held in a machine vice on the saddle at the proper height—or a little careful filing will form them.

The tapped hole for the bearing and the hole for the cylinder trunnion *must* go through dead square. If they don't the sliding faces won't make proper contact—and oil will escape instead of going to the steam chests. If a drilling machine isn't available, use the lathe, with a drilling pad on the tail-stock barrel, and the drill in the chuck.

At 5/32 in. from the upper edge of the bottom angle and at right angles to the surface, drill a 5/32 in. hole 9/32 in. deep, and tap it $\frac{3}{16}$ in. × 40. The right-hand port is drilled right into this. The left-hand port is drilled for $\frac{1}{16}$ in. depth only and a groove the same depth is chipped or milled from the port to the bottom of the stand as shown. With a $\frac{1}{4}$ in. pin drill having a 3/32 in. pilot pin open out the trunnion hole in the back of the stand to full 5/32 in.

Makeshift reamer

The pump cylinder needs a piece of $\frac{1}{4}$ in. × $\frac{5}{16}$ in. brass rod squared off in the lathe at both ends to $\frac{11}{16}$ in. length. On one end mark off the position of the bore as shown, centre-punch it and chuck the piece in the four-jaw with the pop mark running truly. Drill right through with a No 44 drill and put a 3/32 in. parallel reamer through.

If you haven't one just file off the end of a piece of 3/32 in. silver steel at an angle so that it leaves an oval face; harden and temper to dark yellow, rub the oval face on an oil-stone, and you have a most excellent substitute.

Drill the port until it pierces the bore, but don't pierce the bore when drilling the hole for the trunnion pin. If you should be unlucky it won't matter overmuch as long as the trunnion pin (of 3/32 in. steel or bronze) is quite tight and doesn't project into the bore; put the reamer through again after the pin is fitted. Don't forget to true up both the sliding faces, in the same way as you did the slide valves and portfaces of the steam cylinders.

The bottom of the bore is plugged by a little flanged plug turned from $\frac{3}{16}$ in. brass rod, which should just reach to the bottom of the port. It should be a drive fit, but the head can be soldered over as an extra precaution. No gland is needed. As an experiment I tried to force the ram of a test pump into the oil-filled bore with my bush press. No oil escaped past the ram, but it pushed the pressed-in plug out of the bottom of the bore !

The ram or plunger is a piece of 3/32 in. round steel a bare $\frac{3}{4}$ in. long. One end is turned down to $\frac{1}{16}$ in. dia. for about 3/32 in. length and screwed $\frac{1}{16}$ in. or 10 BA. For the little big-end chuck a piece of $\frac{3}{16}$ in. bronze rod, face, centre, drill No 48 to $\frac{3}{16}$ in. depth and part off a $\frac{1}{8}$ in. slice. Drill a No 55 hole in the thickness and tap it to suit the screwed end of the ram. If the thread isn't tight, silver solder it.

Pawl goes clockwise

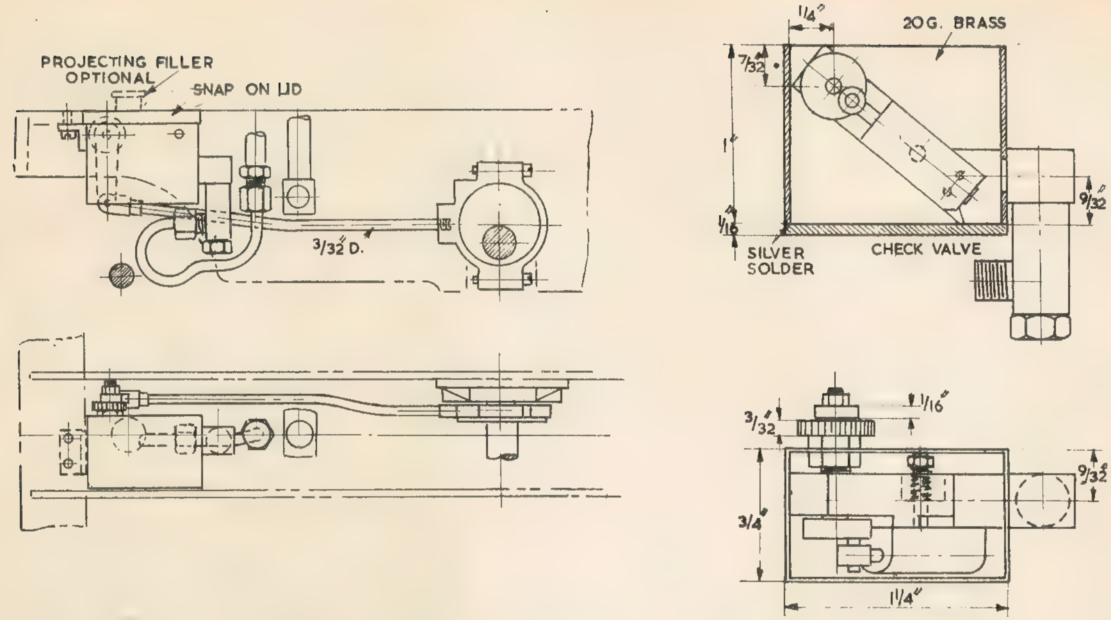
The crankshaft is a piece of 3/32 in. silver steel a full $\frac{13}{16}$ in. long with $\frac{1}{8}$ in. of thread on one end and just enough for a 3/32 in. commercial nut on the other. The ratchet wheel goes on this end.

It is hardly worth while setting up to cut just one wheel, even if a dividing head is available. The drawing shows one with 35 teeth and $\frac{7}{16}$ in. dia. but anything reasonably near that will do. The hole in the middle should be drilled No 43 and the wheel pressed on to the shaft at the shorter screwed end, leaving approximately 5/32 in. projecting.

A warning: be careful to press the wheel on so that the pawl will rotate it clockwise. Looking at the wheel from the shorter end of the shaft the teeth should slope back to your left.

Chuck a piece of $\frac{3}{8}$ in. brass rod, face, centre, drill No 48 for $\frac{3}{16}$ in. depth, tap to suit crankshaft, and part off a $\frac{1}{8}$ in. slide. At $\frac{1}{8}$ in. from the middle drill a No 53 hole, tap it 9 BA and screw in a $\frac{5}{16}$ in. length of 15-gauge spoke wire threaded to suit.

The bearing is made from $\frac{5}{16}$ in. hexagon brass rod. Chuck a piece, face, centre, drill No 41 for a full 1 in. depth, turn 13/32 in. of the outside to $\frac{3}{16}$ in. dia. and screw $\frac{3}{16}$ in. × 40. Part off at $\frac{1}{16}$ in. from the shoulder. Make a lock-nut 3/32 in. thick from the same kind of material, tapping $\frac{3}{16}$ in. × 40.



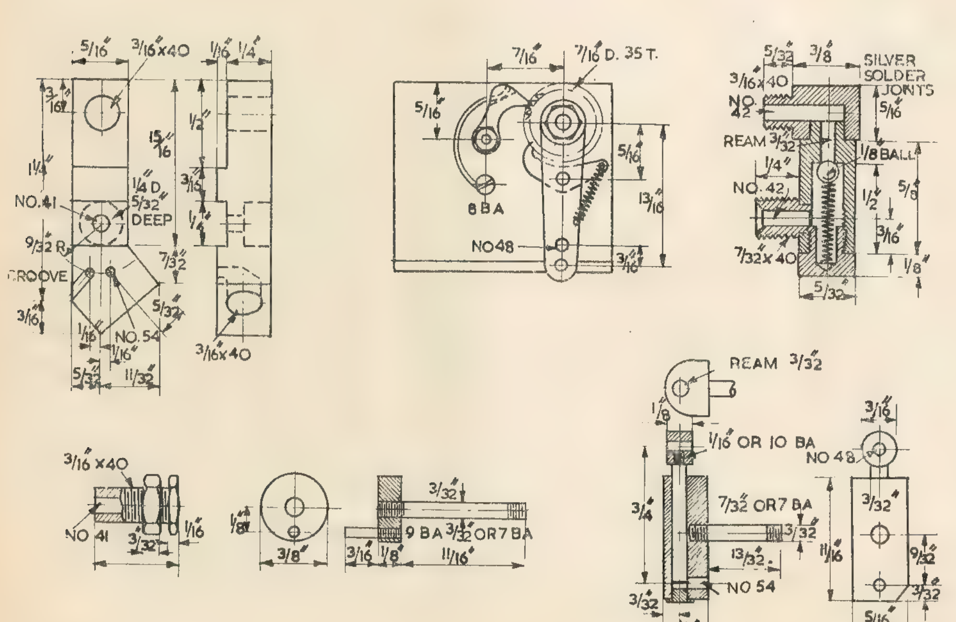
Arrangement of the lubricator; location of the pump in the tank; plan of the lubricator

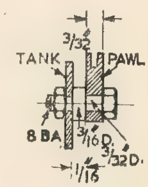
CHECK VALVE

Chuck a piece of $\frac{5}{16}$ in. square brass rod truly in the four-jaw, face, centre, drill to $\frac{7}{16}$ in. depth with 3/32 in. or No 42 drill, turn 5/32 in. of the outside to $\frac{3}{16}$ in. dia., screw $\frac{3}{16}$ in. × 40 and part off at $\frac{3}{8}$ in. from the shoulder. Drill a $\frac{3}{16}$ in. hole in one of the facets.

Chuck a piece of $\frac{5}{16}$ in. round brass rod, face, centre, drill to a full $\frac{3}{4}$ in. depth with a No 44 drill, open out and bottom to $\frac{1}{2}$ in. depth with $\frac{3}{16}$ in. drill and D-bit, slightly countersink the end, tap 7/32 in. × 40 for $\frac{3}{16}$ in. depth, skim the end true and part off at a bare $\frac{3}{4}$ in. from the end. Reverse in the chuck and turn down 3/32 in. of the other end to a tight fit in the hole in the side of the square boss. Put a 3/32 in. reamer through the remains of the No 44 hole and press the spigot into the boss.

At $\frac{3}{16}$ in. from the bottom drill a $\frac{3}{16}$ in. hole in line with the screwed end of the boss and fit a 7/32 in. × 40 union nipple into it. Silver solder





The pump stand; ratchet gear; check valve; stationary pawl and spindle; bearing and crankshaft; pump cylinder

both joints at the one heating. Chuck a piece of $\frac{3}{16}$ in. hexagon rod, face, centre, drill No 32 for $\frac{3}{16}$ in. depth, turn 5/32 in. of the outside to 7/32 in. dia. and screw 7/32 in. × 40. Part off at $\frac{1}{8}$ in. from the shoulder, reverse in the chuck and chamfer the corners of the hexagon.

Seat a $\frac{1}{8}$ in. rustless ball on the reamed hole and assemble as shown with a light bronze spring to keep the ball on its seating, as this valve works upside down.

THE ASSEMBLY

See that the faces of the stand and pump cylinder are quite clean, then smear them with cylinder oil, put the trunnion through the hole in the stand, and secure with a commercial nut, putting a short spring on the trunnion in the pin-drilled recess in the stand. Put the lot in the tank, with the tapped hole in the bottom angle against the corresponding hole in the tank, and screw the check valve into it.

Put the end of the bearing through the upper hole in the tank, and hold the lock-nut against it, screwing the bearing through it and entering it into the hole in the top of the pump stand. Screw it in until the head of the bearing just touches the side of the tank, then screw the lock-nut back against the inside of the tank. The pump will then be firmly held in the correct position.

Push the crank pin through the big-end on the ram, hold the crank opposite the end of the bearing and screw the crankshaft through the bearing into the crank. When right home the ratchet wheel should come up against the head of the bearing, leaving the crank free to turn but with no appreciable endplay on the shaft. If too tight or too slack adjust the position of the ratchet wheel on the shaft.

The pump can now be tested. Half-fill the tank with oil—any motor-engine oil will do, cylinder oil isn't essential—and turn the ratchet wheel slowly clockwise. When oil appears at the union screw on the check valve press your thumb over the end and continue to turn the ratchet wheel.

If the pump is satisfactory you won't be able to prevent oil escaping from the union nipple no matter how hard you press. If the oil doesn't force its way out then there is something amiss; it may be that the faces are not making proper contact and oil is escaping between them, or the spring may not be strong enough. The remedies are obvious !

RATCHET GEAR

The ratchet lever is filed up from a bit of $\frac{3}{8}$ in. × $\frac{1}{16}$ in. mild steel strip and drilled as shown in the drawing of the erected ratchet gear. The pawls are filed up from any odd bits of 3/32 in. mild steel that happen to be handy.

The moving pawl is pivoted on an 8 BA screw in a tapped hole in the lever, the part passing through the pawl being plain. It is held against the teeth of the wheel by a light spring connecting its tail with the lever (see drawing).

The stationary pawl—nicknamed bird's head on account of its shape—is pivoted on a spindle turned from $\frac{3}{16}$ in. round steel, as shown in the detail sketch. The shorter end passes through a hole in the tank drilled No 43 and is nutted. The longer end has a full 3/32 in. left plain on which the pawl works, and a nut prevents it from coming off. This pawl is kept in contact with the teeth by a wire spring bent as shown, bearing in a groove filed at the top of the pawl.

The bottom end of the wire spring is looped around an 8 BA screw nutted inside the tank. Both pawls should be casehardened by the simple process I have described on previous occasions. They should be quite free on the spindles; if they stick the crankshaft will simply oscillate and the pump will naturally cease to feed.

The lever should also be quite free to oscillate when the nut is tight at the end of the thread, but should not swing laterally.

THE ERECTION

Owing to the limited space between frames the lubricator will have to be erected to one side as shown in the plan, but this is no detriment. Drill two No 41 holes in the angle attached to the front of the tank, about $\frac{5}{16}$ in. apart.

Put the lid on the lubricator (a clearance will have to be filed in the bent-over part to clear the head of the bearing), turn the chassis upside down on the bench and set the lubricator so that the top is flush with the top of the frame and the tank close to the buffer beam, with the side of it about $\frac{1}{16}$ in. clear of the left-hand frame. The angle should rest on the beam. Put the No 41 drill through the holes in the angle and make countersinks on the beam, follow with a No 48 drill, tap 3/32 in. or 7 BA and put a couple of screws in.

To keep the lubricator steady drill another No 41 hole through the frame and side of the tank—at the position shown in the assembly drawing—and put a 3/32 in. screw through, with a washer between the tank and frame, nutting the screw inside the tank.

The lubricator can then be filled by removing the lid or, alternatively, a $\frac{1}{4}$ in. hole can be drilled in the lid, a $\frac{1}{4}$ in. ring of $\frac{1}{4}$ in. tube soldered into it and a push-fit cap turned from a piece of $\frac{3}{8}$ in. rod. This will project up through the plate between frames, but it won't be unsightly and will save the necessity of removing the plate and lid every time the tank needs refilling.

The union screw on the check valve is connected to the one under the cross steam pipe by a piece of $\frac{1}{8}$ in. copper tube with a union nut and cone at each end. Bend it as shown in the arrangement drawing to clear the pony axle and bolster.

The eccentric strap is made up from a casting in the same way as described for the water-pump eccentric, but is only $\frac{1}{8}$ in. wide—in order to fit in the limited space. The two halves can be held together by $\frac{1}{16}$ in. or 10 BA screws, which are quite strong enough, as there is very little stress on the eccentric.

The rod is a piece of 3/32 in. silver steel, with a little fork or clevis at the lubricator end, made in the same way as valve-gear forks, from $\frac{3}{16}$ in. square rod. The jaws of the fork should be drilled No 48 and the pin made from a little piece of 15-gauge spoke wire screwed 9 BA and nutted at each end. It should be quite free to turn when the nuts are tight.

To get the length of the eccentric-strap-and-rod assembly between the centres of strap and holes in the fork, set the ratchet lever vertically and measure from the middle of the bottom hole to the centre of the leading coupled axle. Owing to the lever being short—which is necessary to keep it clear of the pony truck frame when the engine is on a curve—the moving pawl will over-run the ratchet tooth at each end of the stroke but not enough to ratchet two teeth at each stroke, so this won't matter. Better over-run than miss altogether !

Builders who don't object to the lubricator tank standing above footplate level (I don't) can fit one of my standard-size lubricators with a tank $1\frac{1}{4}$ in. deep and a vertical pump between the frames if they reduce the width of the tank to suit the frames. It can be attached to the front beam in a manner similar to that described, using a longer and stouter piece of angle.

There is no need to fit the ratchet gear inside the frame; the spindle can be extended through a hole in the frame and the lever and wheel fitted on the outside, the stationary pawl being attached to the frame instead of the tank. The check valve underneath should be fitted with the union nipple pointing to the back.

Well, that's about all for the working parts of the engine. The next stage is the boiler.

● *To be continued*

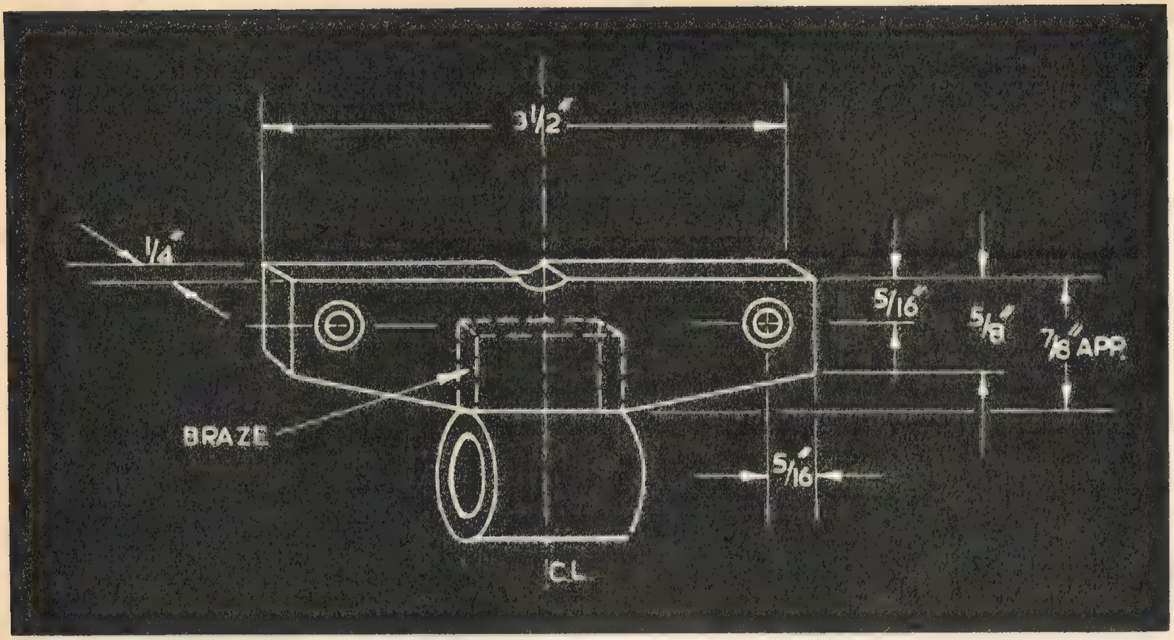


Fig. 3: Chief dimensions for modified leadscrew nut fixing

Modifications to an EW lathe

MARTIN CLEEVE details an improved fixing for the leadscrew nut

It is thought that the modified fixing for the leadscrew nut (Fig. 1) will meet with the approval of EW owners.

For the benefit of those not familiar with this lathe it should be explained that the original method of fixing was somewhat complicated and had the disadvantage of restricting the forward movement of the cross slide by about ⅞ in. Of course, this does not matter so much for ordinary turning operations, but when milling or slitting work mounted on the cross slide, the question of available travel becomes quite important.

Fig. 2 shows the new T-slotted cross slide in its fully closed position —from which it may be retracted about 4½ in. with two jib adjusting screws still taking effect.

As the leadscrew nut already had a rectangular projection it was a fairly simple matter to braze it into a prepared piece of mild steel bar—though my friend, who carried out the job, did admit that a slight half-round clearance for the cross-feed screw would have looked better. I have drawn it thus in Fig. 3, which gives the principal dimensions.

PREPARATION OF FIXING

One of the most important points to take into consideration is to make quite sure that the nut is exactly concentric with the leadscrew. A check for parallelism can be made before brazing, but the question of height must be approached in a slightly different manner.

In this case the new mild steel support into which the nut was fixed was made initially from a piece of 1 in. × ¼ in. bright mild steel bar. After shaping the underside (Fig. 3) and brazing the nut into position, the assembly was threaded on to the leadscrew and presented to the face of the saddle to which it was to be fixed.

In this particular case about ⅛ in. had to be removed from the upper side of the bar. But as the leadscrew nut was not a remarkably good fit, care was taken to see that it was in a "neutral" position and that the leadscrew was quite free to revolve before scribing the rear of the bar with lines level with the cross slide slide ways. These lines, of course, were used as guides for the removal of the unwanted eighth.

Having finally cut and cleaned up, the positions of the two fixing holes were marked and drilled tapping size for No 1 BA—No 17 drill for 85 per cent thread—these then being used as a guide for drilling the saddle. Hexagon socket head cap screws were used for fixing, the heads being countersunk to the appropriate depth.

FINAL ADJUSTMENTS

When tightening these fixing screws, the leadscrew should be rotated backwards and forwards by hand to see that it remains free to revolve. In this case it was necessary to interpose some packing between the saddle and bar. After experimenting a little

Modifications to an EW lathe

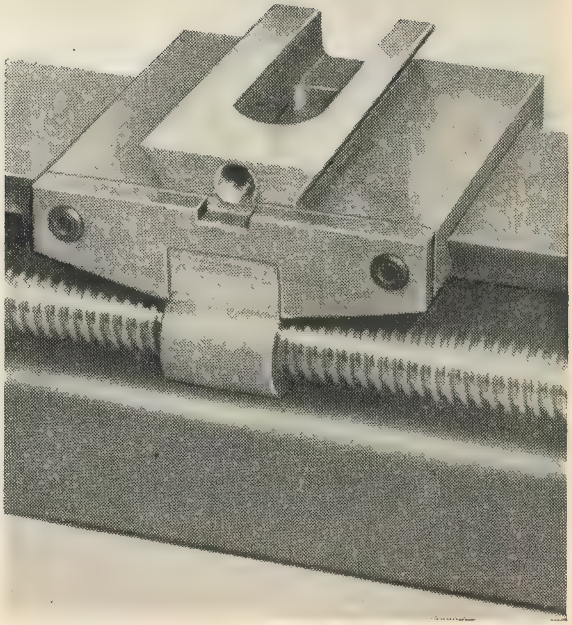
it was found that three strips cut from an odd piece of sheet zinc completed the job with every satisfaction.

Zinc, by the way, is favoured for this kind of packing as it is readily flattened by the normal pressure from the fixing screws; in addition, it is easily trimmed after assembly.

The T-slotted cross slide (Fig. 2) was built up on strict fabrication principles. It is 7 in. long, 3 in. wide and $\frac{7}{8}$ in. thick, the whole being made from various mild steel sections.

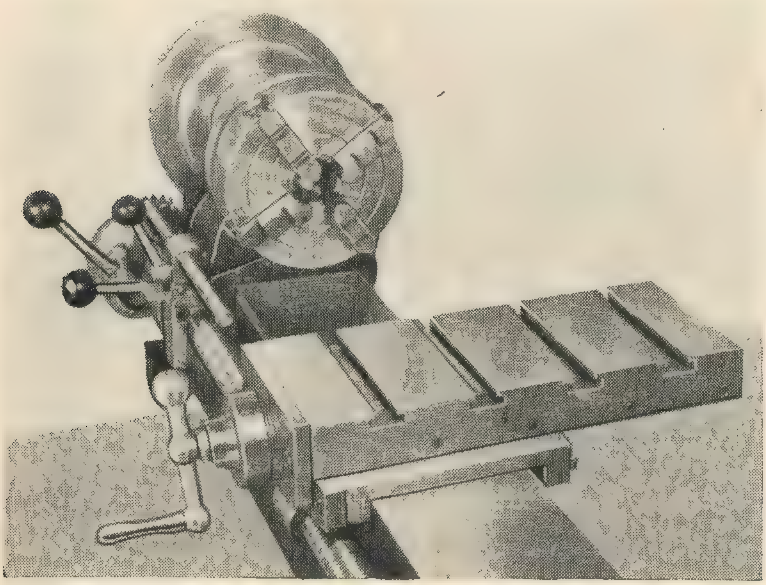
The four equally spaced T-slots are for $\frac{5}{16}$ in. BSF bolt heads, suitably thinned. As each T-member was separately milled before assembly, the amount of metal which had to be removed to form the required "step" was very small, and there was absolutely no risk of breaking the cutter.

The main slide ways were made in the same manner as those described in a previous series—"A Lathe you can Build"—and the completed slide has proved itself amply capable of meeting any normal demand placed upon it. ▣



Right, Fig. 1: The modified fixing for the lead-screw nut

Below, Fig. 2: How the new fixing allows full closure of the cross slide



New lubricant for free-piston engines

A SPECIAL lubricant for free-piston engines has been developed by Shell.

Tests leading to the development of this lubricant have taken six years and have been done in collaboration with Societe Industrielle Generale de Mécanique Appliquee of Lyons, and General Motors in the United States; it is already in use in practically all the gas generators built by SIGMA.

Late in 1950, when SIGMA had begun small-scale production of GS 34 units, experience revealed that cylinder and piston ring wear rates and cylinder and piston cleanliness were unsatisfactory—problems that were traced to the limitations of the steam cylinder oil used for cylinder lubrication.

Various Shell lubricants were tested and the best was subjected to a 500-hour endurance test in a two-cylinder electric generator unit at Rheims. At the conclusion of this test a strip-down of the engine revealed a marked improvement in cleanliness and a sharp reduction in wear. ▣

G. A. Foot's Stuart yacht KATHERINE, which is a very colourful craft

SQUARE SAILS *on the* ROUND POND

By EDWARD BOWNESS

THE Annual Sailing Rally at the Round Pond, organised by the Thames Shiplovers and Ship Model Society, is becoming an important event in the model maker's calendar. The first rally took place at Hove in 1951, but since the venue was changed to London three or four years ago it has developed into a more important event.

The purpose of the rally is to encourage the building and sailing of models of square riggers, spritsail barges, fore-and-afters, and, in fact, models of any sailing craft not designed specially for speed. The idea has caught on, and a fleet of Thames barges has been built, all to $\frac{1}{2}$ in. scale, as well as quite a number of square-rigged ships and barques, and smaller craft.

Sailing models of prototypes can be very fascinating. The spritsail barge is fast disappearing from the Thames estuary, and square riggers are practically a thing of the past, but a good model of these types re-creates all the thrill of the real thing. How many sail enthusiasts have ever seen a big square-rigger at sea—a sight often considered the most thrilling of all that the sea can provide? With a good model one can see it again and again.

The recent rally provided such thrills in abundance, and as there was more than enough wind at times, sailing reefed down with the lee rail under was a frequent sight. Ken Williams' big four-mast barque *Star of the South* was able to take it and made a wonderful picture, and C. L. Robinson's *Caliph* and P. Gould's *Cutty Sark* both looked lovely, although hard pressed at times.

Nor was the historical aspect overlooked. C. V. Thompson sailed his *Golden Hind* successfully, and G. A. Foot's Stuart yacht *Katherine*, with its gilded stern and gay array of flags, was a colourful picture on the water, although as a model she was a little crude when seen at close quarters.

The trophy for the best square-rigged model went to R. C. MacCormac for his model of the three-mast topsail schooner *William Ashburner*. (Incidentally, the topsail schooners were classed as square-riggers.) Runners up were P. Gould's *Cutty Sark* and F. Pearson's *Ocean Queen*. There were no fewer than 17 entries in this class.

D. C. Eyles won the medal in the fore-and-aft class with his four-mast schooner *Circe* and his fishing ketch *Highland Maid* was placed second. This was a double-ender with beautiful lines, and sailed very fast on a wind.

W. Gay's Cochin China *Gay Bao* was the winner in the Native class, followed closely by J. Hardy's Kwei river boat. This was a tiny craft full of interesting detail.

There were six entries in the Thames barge class, and in every case they were very realistic models. The race across the Pond and back was started by Sir Harold Dankwerts, the well-known judge, who is a keen shiplover. The winner was J. J. Starkey with his veteran *Janice* and his newer model *Lily May* came in second.

The Thames Barge Club Trophy was also awarded to *Janice*. Mr Starkey has had years of experience in sailing model barges, but the other competitors are rapidly approaching his standard; also two or three of his keener rivals were unable to attend this year.

The barges were judged by J. L. Bowen and C. P. Martin and the remaining classes by E. Bowness and W. O. B. Majer. The prizes were presented by Mrs Basil Lavis at the MYSA Clubhouse, which was kindly made available. John Fisher, secretary of the Thames Shiplovers and Ship Model Society, was in charge of the arrangements and did a very good job. ■

Top: R. C. MacCormac with his tops'l schooner WILLIAM ASHBURNER. *Centre: The winning model* JANICE *receiving attention from its owner J. J. Starkey. Bottom: D. C. Eyles' schooner* CIRCE, *winner in the fore-and-aft class, sailing serenely across the Round Pond*

The workshop
SHAPING MACHINE

DUPLEX now turns his attention to the jig and goes on to outline the setting up of the work

A SIMPLE jig of the kind illustrated in Fig. 6 will be found useful for stoning the tips of lathe and shaping machine tools, so as to smooth the cutting edge and thereby impart a good surface finish to the work. Although this is commonly done by an oilstone slip held in the hand, there is always the danger that careless or unskilled use of the stone may reduce the tool's clearance angle and impair its efficiency.

The oilstone or India stone is located in the jig at an angle of, say, 10 deg. to the tool's axis by the two plates that form the side members of the jig; these guide plates also serve to support the stone as it is worked to and fro across the end face of the tool. The tool itself rests on the base of the jig and is held in contact with one of the side plates if the flat formed at the tip is to be honed at right angles to the long axis of the tool, but this angle can be varied at will.

The tool illustrated on the left of Fig. 7 has a broad, slightly curved cutting edge and is designed for use in a rigid shaping machine to finish the work with a light, scraping cut. The spring tool shown on the right of Fig. 7 will take a scraping cut without chatter, since the cutting edge will tend to lift away from the surface of the work if the pressure of the cut becomes excessive or a hard spot is encountered. Although a smooth surface finish may be obtained in this way, it may be at the expense of accuracy.

Not all varieties of carbide-tipped tools are suitable for machining steel, because this sintered material has an affinity for steel that may lead to cratering and ultimate breakage of the tool's cutting edge. This trouble is not experienced when machining cast iron with these tools and, for this purpose, they are far in advance of high-speed steel tools when used in the lathe or shaping machine.

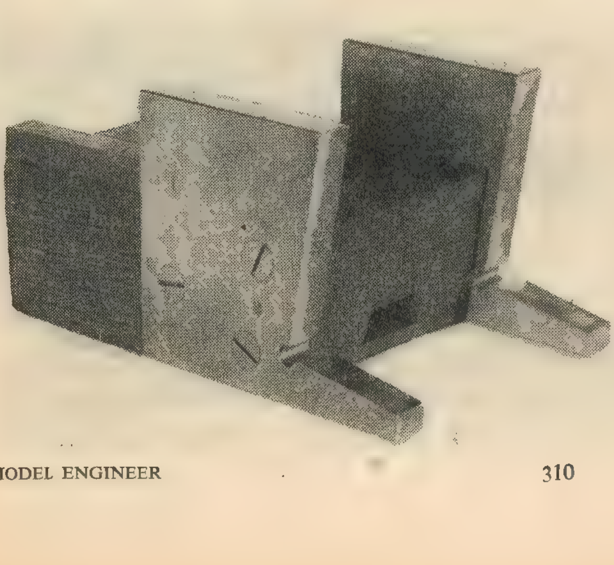
Nevertheless, a suitable type of carbide tip is required to avoid breakage when the tool is used to machine irregular surfaces, for tungsten carbide, although intensely hard, is somewhat brittle when subjected to shock.

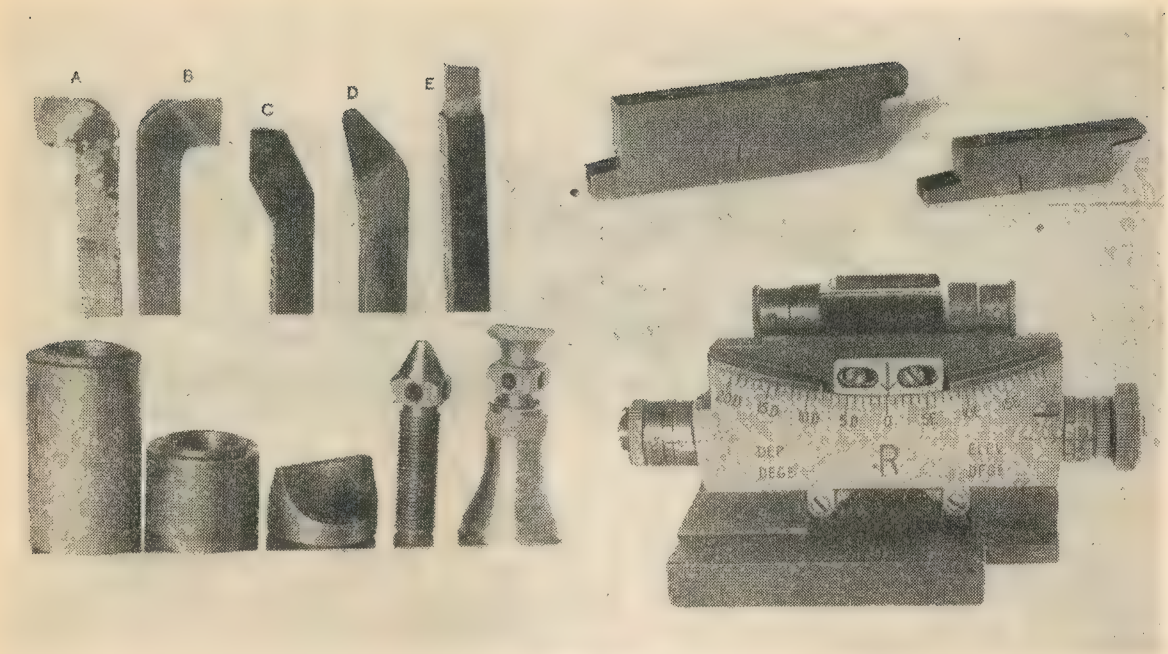
The group of carbide-tipped tools illustrated in Fig. 8 has been found adequate for ordinary machining operations of iron castings. The two tools *A* and *B* are right-hand and left-hand tools used for machining vertical faces and into corners. Tool *C* is a cranked, right-hand, knife tool with a slightly rounded tip, suitable for machining both flat and vertical surfaces.

Tool *D* has a well-rounded tip and leaves a high finish on the work where a final, light cut is taken. The right-hand knife tool *E* has an almost sharp point for cutting right into a corner.

The only real difficulty with these tools is that it is an advantage to sharpen them on an expensive, diamond wheel, although some workers obtain satisfactory results by using a special green-grit abrasive wheel. But in the small workshop, carbide-tipped tools last so long before resharpening becomes neces-

Below and right, Figs 6 and 7: A useful jig for stoning shaper tools and a finishing and a spring tool





Figs 8, 10, 11 *and* 12: *A group of carbide-tipped tools; adjustable, parallel packing blocks; a small screw-jack and accessories; a sensitive spirit level*

sary that this is a minor problem and one perhaps best solved by having the tools re-ground and lapped in a factory where the proper equipment is available.

SETTING UP THE WORK

The machine vice will serve for setting up most of the components dealt with in the small workshop, but to ensure satisfactory machining this vice must be accurately made and the surface on which the work rests must be exactly parallel with the under side of the base. In addition, the fast jaw must stand truly at right angles to the vice floor.

These essential requirements can be checked with an accurate square and by mounting a test indicator in the tool post and then sliding the ram to and fro to move the indicator across the floor of the vice. When both the work table and the vice have been checked in this way, ground, parallel packing strips can be used to raise the work in the vice jaws and align it correctly.

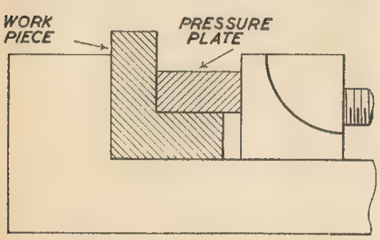


Fig. 9: Holding work of irregular shape in the machine vice

Where, as illustrated in Fig. 9, an irregularly-shaped component, such as a piece of angle iron is gripped in the machine vice, a packing-piece should be inserted to press the work squarely against the fixed jaw. If a datum surface has been machined on the work, this face should always be placed against the fixed jaw to ensure accurate alignment.

When a rough casting is gripped for the first time in the vice for the purpose of forming a datum face, the usual requirement is to set it up so that it can be trued by removing as little surplus metal as possible. This initial set-up can be checked by travelling the test indicator over all four margins of the upper surface of the work; any required adjustment is afterwards made by resetting the work in the vice.

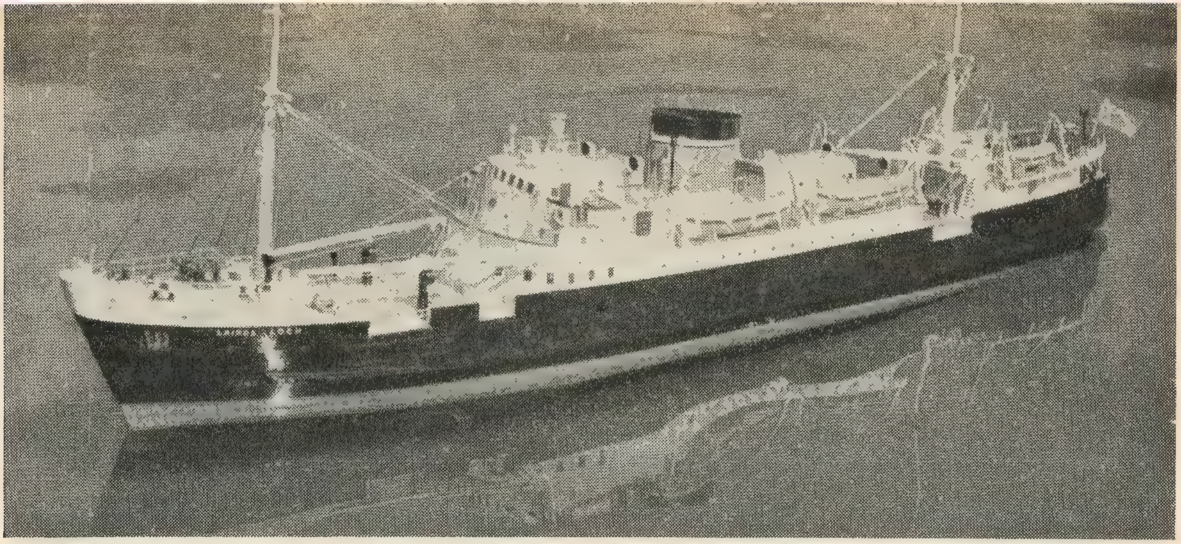
To maintain the work in the correct position in the vice during machining it may have to be supported on a packing. For this purpose, the adjustable parallels illustrated in Fig. 10 can be employed. The small screw-jack, with its several fittings, provides a ready means of supporting the overhanging end of work held in the machine vice; for example, a long spindle in which a keyway is being machined.

A quick and easy way of aligning work in the vice is to use a spirit level, but to obtain the full advantage of this method the shaping machine itself should have its table accurately levelled at the time of installation. The level used for this purpose in the workshop is shown in Fig. 12.

This instrument is a clinometer gun sight—obtained as war surplus in 1920—and it has the advantage that when placed on a flat surface it can be adjusted with a finger-screw to bring the bubble to the zero line engraved on the grass tube. In practice, the clinometer is placed on the work table of the shaper and the bubble is centred; on transferring the level to the work, the latter is adjusted in the vice until the bubble is again brought to the zero mark. This procedure is then repeated, but in a plane at right angles to the first.

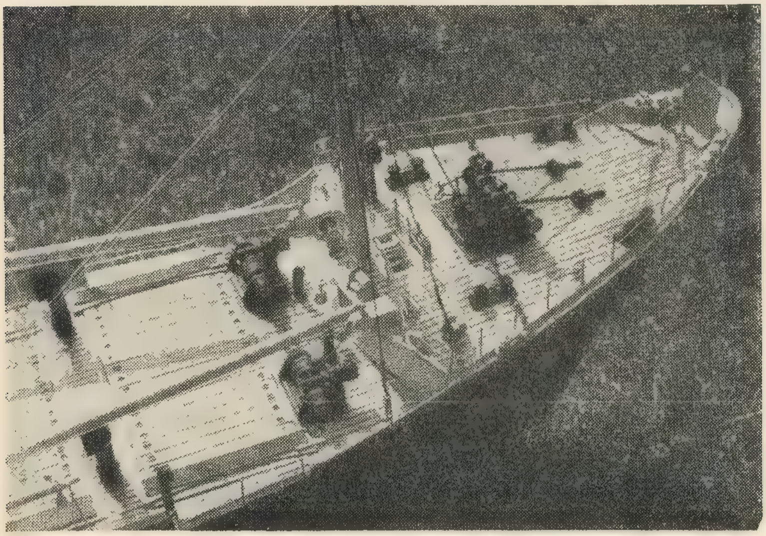
When work is set up in this way, a reasonably high degree of accuracy is attained, which is quite sufficient to ensure that the minimum amount of surplus metal needs to be removed to true the surface of the casting and form a reliable datum surface, for the measured sensitivity of the clinometer is such that it indicates a difference in level amounting to 0.001 in. in 6 in.

● *To be continued*



A working model of the motor-vessel *LAIRDS LOCH*

This 4 ft 3 in. ship is D. W. GREENSLADE'S eighth model. The problem, he says, is where to keep them



The bow view shows splendid detail

THE wood cut from the centre of the hull of my last ship, a 6 ft model of the m.v. *Kronprinsesse Ingrid*, left me with several 8 in. planks of prime obechi timber measuring 4 ft 6 in. in length. So I looked around for a suitable ship, 260 ft to 280 ft overall, that as a model would work out about 4 ft 3 in. at a scale of $\frac{3}{16}$ in. to 1 ft.

After hunting through many shipping magazines, I then approached Burns and Laird Lines and asked them to lend me plans of their m.v. *Lairds Loch*. My luck was in and they lent me comprehensive plans and photographs that enabled me to build a detailed model of this ship.

The m.v. *Lairds Loch* was built by the Ardrossan Dockyard Co. in 1944, for the cattle and livestock trade between the Clyde and the Irish ports. She is a vessel of 1,735 tons gross and her length overall is 276 ft. The *Lairds Loch* can accommodate over 400 livestock; large loading doors are built into the hull to facilitate the loading of cattle. The weather boards on the upper deck are removed for this purpose and hinged gangways are used to provide passage when these weather boards are lifted.

The ship also has comfortable accommodation for passengers in single and double berth cabins. Extra accommodation has been added in the form of a deck house built on the boat deck just aft of the streamlined funnel. The *Lairds Loch* is now running between Glasgow and Londonderry on the night service. In summer a call is made at Greenock where passengers may join the ship if they wish.

The service speed of the ship is 13 knots, and she completes the journey in 12 hours. The main engines of the ship are two British Polar diesels, each having eight

cylinders with a diameter of $13\frac{3}{8}$ in. and of $22\frac{7}{16}$ in. stroke.

The plans lent to me by the Burns and Laird Lines were very detailed and showed every facet of the deck equipment; from them I drew up a set of plans to $\frac{3}{16}$ in. scale.

The owners also gave me a copy of the *Motor Ship* for February 1945, in which a description, and photographs of the ship as built, appeared. These photographs and plans showed the ship with her cut-down wartime rig, but there was much useful information and the pictures of the Clarke-Chapman anchor windlass and the Scott electric cargo winches proved most helpful in making these components.

The model is built in the bread and butter fashion, each plank cut out to the dimensions shown on the lines plan, with a bow saw. The planks are glued with resin glue, and the hull shaped up, using templates to get the true shape. The thickness of the walls of the hull is about $\frac{3}{8}$ in. when finally gouged out. The bottom plank is made about $\frac{7}{8}$ in. thick to provide enough thickness to take the mounting screws for the electric motors, and lead ballast.

Decks and superstructure are made from $\frac{1}{16}$ in. resin-bonded ply. The decks are planked on top of the ply wood, with $\frac{1}{8}$ in. × $\frac{1}{16}$ in. hard balsa. A thin strip of black photograph mounting card cut with a sharp knife and steel rule is glued between each plank as it is laid. The decks are banana oiled.

Details of the boat deck with the deck house aft of the funnel

The superstructure is built up using $\frac{1}{4}$ in. square obechi framing and brass lil pins. Durofix cement is used for all the small gluing jobs.

The weather boards are of $\frac{3}{16}$ in. × $\frac{1}{16}$ in. obechi. Each one is fitted with a lifting handle made by drilling each plank before it is stuck down and fitting, across the hole, a lil pin with the head cut off to represent the lifting bar.

Although this is a working model, I planned to try to reach the best exhibition standard of detail and finish. The job of painting and rubbing down the hull is a long and tedious one, but there are no short cuts to a good finish. I have tried many different finishes on my models, but find that I get on best with cellulose.

Red cellulose primer is used for the first eight coats, rubbing down with wet or dry sandpaper, used wet

A port view of D. W. Greenslade's 4 ft 3 in. model

between successive coats. Two coats of under coat are used, and two of brushing cellulose, rubbing down with very fine No 320 waterproof abrasive paper between the last coats.

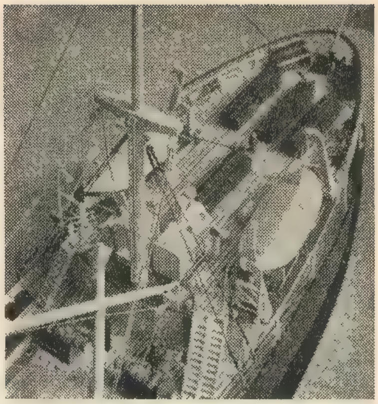
The boot topping is marked with a pencil using a surface table scriber to hold the pencil, but as the boot topping follows the sheer line, and not the horizontal, the ends have to be drawn free hand. Scotch tape is used for masking.

One of the worst jobs is putting the draught marks on the stem and stern, but a really good springy brush helps a lot.

For all my small fittings I use model aircraft dope. The final coats usually have to be thinned about 50 per cent.

I enjoy making the many deck fittings. I have no lathe, and have to work on the kitchen table, but most fittings can be made using dowels, odd scraps of brass, plastic and wire as the raw materials. I always buy my stanchions, however, as these are beyond my ability to produce without a lathe. In fact, it would be a job I wouldn't much like to tackle even if I did have a lathe. I have also bought some plastic portholes, and a few cowl ventilators, as these fittings are cheap and hardly worth making.

Navigation lights are cut from round brass rod, and plastic lenses made out



Many of the deck fittings were made from buttons, odd scraps of brass and plastic, and wire

of tooth brush handles are fitted, red, green and clear.

Life belts are cut from plastic shirt buttons and quartered red and white. The two lifebelts on the front of the bridge are in racks. Being a dental technician by profession, I was able to use dental plastic to make the floodlights and lifeboat lights.

All the standing rigging is set up with heart-shaped cringles, V-shackles and rigging screws. The derricks are made from dowels, with hinges of brass rod. All cargo blocks are complete with brass sheaves.

The radar scanner is mounted on top of a trellis mast, constructed from brass wires soldered together. There is also a DF loop aerial and Morse lamp on top of the bridge.

The funnel is made from brass with half round brass wire soldered on to divide up the colours. A syren is mounted on the front of the funnel, and there is a slatted staging with hand rails and ladder fixed under the syren. The top of the funnel has two exhaust outlets from the main engines, three small exhausts from the generators, and a donkey boiler funnel.

The power is provided by two Bassett-Lowke marine electric motors, each driving a propeller direct, without gearing. The $1\frac{3}{4}$ in. dia. screws are contra-rotating. Two six volt lantern batteries supply the electric current.

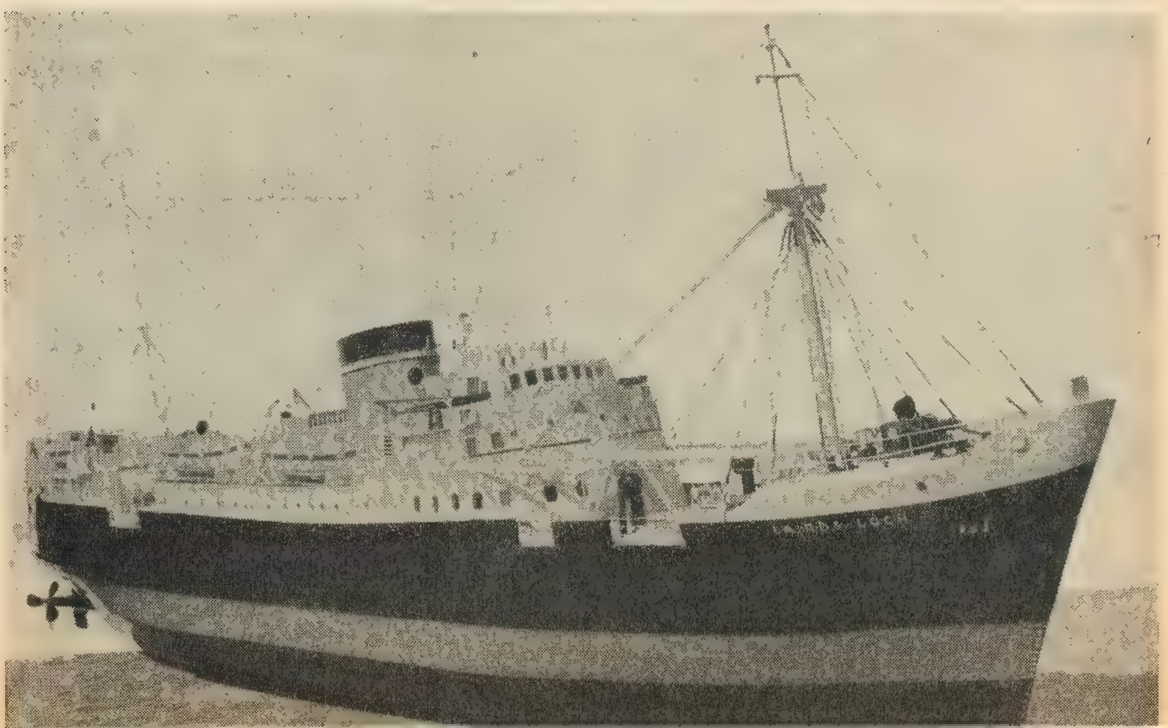
The model has a black hull with red oxide boot topping. The boot is black also. The upperworks are painted cream and the funnel is bright red with a black top, separated by a narrow light blue band. The masts and derricks are cream.

This model is very stable, although built to scale without any increase in displacement. The speed seems about right, but I think it is perhaps a little bit faster than scale.

I have just completed a glass case to keep the model in, and to protect it from dirt and dust, and to carry the model to the pond, I have made a cradle with sorbo-lined crutches to support the hull.

Of my eight models, some are on loan to the Dartmouth Borough Maritime Museum, and that gives me a bit of extra room. But next winter I plan to build the m.v. *Venus*, of the Bergen Line, if I can get the plans, and that one will be over 6 ft 6 in. long ! ▣

The starboard view reveals the ship's graceful lines



Do not forget the query coupon on the last page of this issue

READERS' QUERIES

This free advice service is open to all readers. Queries must be on subjects within the scope of this journal. The replies published are extracts from fuller replies sent through the post: queries must not be sent with any other communications: valuations of models, or advice on selling, cannot be given: stamped addressed envelope and query coupon with each query. Mark envelope "Query," Model Engineer, 19-20 Noel Street, London, W1.

Quadrant removal

I am the owner of an ML7. I wish to remove the quadrant for the purpose of fitting a detent for dividing off the change wheels fitted on the end of the mandrel as recommended by Duplex [Vol. 3 of *In the Workshop*, chap. 1].

On taking off the retaining ring and the distance ring on the end of the mandrel and removing the leadscrew wheel, I find it impossible to get the quadrant over the Woodruff key in the leadscrew. I suppose I could take out the leadscrew by uncoupling the hand wheel at the right-hand end and slackening the retaining collars, but I do not propose to try that unless recommended.

Would it be wise to take out the Woodruff key? If so, how? I thought of getting a bit of brass tube and using that on the outer end of the key and gently tapping with a rawhide hammer, easing the thing out gradually. It could be replaced by cramping it, after insertion, in a large-size toolmaker's clamp.

What is the best way to proceed?—D.A.G., Elgin, Moray.

▲ *There should be very little difficulty either in removing the leadscrew by the methods you suggest or extracting the Woodruff key so that the quadrant will slide over the leadscrew. It should not be difficult to shift this key, though it is possible that it may be a little tighter than usual in your case and, if so, the application of a little penetrating oil may help to ease it.*

The usual way of removing a Woodruff key is to tap it gently with a brass or copper drift at the extreme end so that it rotates in the keyway. But before doing so some support under the end of the leadscrew is advisable so that there is no tendency for it to be bent under the hammer blows.

Water-cooling a Jensen

I am going to install an air-cooled Jensen CI Special four-stroke overhead valve petrol engine in *Sea Maid*. Is there any way of water-cooling this engine?—M.L., Huddersfield, Yorks.

▲ *Yes, by turning away the air-cooling fins, with the exception of the top and bottom fins, and press fitting a brass or copper tube over these. This has been done by several users of such engines, and water circulation can be supplied by fitting a small scoop or open-ended pipe immediately aft of the propeller so that water is forced through the system by the slip stream.*

Incidentally, these and other types of air-cooled engines have been used quite successfully in enclosed boats by fitting an engine-driven fan to direct air over the cylinder.

The Allchin

Could you please give me the name and address of a firm who will cut the worm and wheel for the steering of the Allchin ME traction engine?—W.M.C., Edgware, Middx.

▲ *Bond's o' Euston Road, 357 Euston Road, London, NW1, would undertake this work.*

Balance weights

I am building *Maisie* to LBSC's words and music. The drawing shows the balance weights on all four driving and coupled wheels exactly the same. Is this correct, or should they be changed?—F.S., Dover.

▲ *The balance weights in the wheels of the Great Northern Atlantics would appear from photographs to have been subject to considerable variation. It is believed that originally there were balance weights in the driving wheels only, the coupled wheels being without weights of any kind.*

So far as a model is concerned the wheel castings which you have obtained would most likely be satisfactory, and it is probably fair to say that you would not care to go to the trouble of working out the sizes and positions of weights that would satisfactorily balance your model with anything like accuracy.

The whole matter from the theoretical standpoint at any rate must depend upon the masses of the rotating and reciprocating parts in the model—and that would be an extremely involved business.

Furnace size

I would like to try making some iron castings, using a crucible up to about 16 lb. capacity. Do you think the furnace described in *Foundry Work for the Amateur*, 9 in. square inside with 9 in. × 4½ in. × 3 in. firebricks, would handle this size? If not, what size furnace would you recommend?—C.S., Montrose, Angus.

▲ *The furnace described in "Foundry Work for the Amateur" would be somewhat on the small size for your purpose having regard to the fact that iron will require considerably more heat than non-ferrous metals for which this furnace is primarily designed. Therefore, you are recommended to use a furnace having about a 50 per cent larger grate area and also considerably thicker refractory lining to deal with the higher temperature.*

For Netta

Can you tell me, please, the boiler working pressure and hydraulic test pressure for *Netta* in O gauge?—R.V.S., Cardiff.

▲ *The pressure should be about 35 p.s.i., and the hydraulic test should be taken up to 70 lb.*

A Montagu whaler

I wish to build a model of a 27 ft Montagu whaler to a scale of an in. to 1 ft. Can your tell me where I can get the necessary plans and information?—W.M.A., Cheadle, Cheshire.

▲ *There are good drawings of boats for naval ships in the "Manual of Seamanship," Vol. 1, published by the Admiralty and obtainable at HM Stationery Office. These include a scale profile and a dimensioned sail plan of the 27 ft Montagu whaler, but not hull lines. However, for the older types these may be obtained from the National Maritime Museum, Greenwich.*

It is believed that there are no other authentic drawings on the market.

Loco colouring

I should be obliged if you would advise me what colours to paint my partly-constructed 3½ in. gauge *Britannia*—i.e., the frames, bogie and pony trucks, cylinders, wheels and motion brackets.—K.B., Much Hoole, Lancs.

▲ *The Britannia class of locomotives are painted the standard British Railways Brunswick green with black striping and orange lines. The frames, bogie, pony trucks, cylinders, wheels and motion brackets are black, but the cylinders are also lined at each end with a double orange line.*

POSTBAG

The Editor welcomes letters for these columns, but they must be brief. Photographs are invited which illustrate points of interest raised by the writer

STUDS AND NUTS

SIR,—On page 119, of ME, July 25, I have noticed with some surprise that W. G. Hughes has included an illustration of part of the cylinder block of his Allchin prototype, and refers to the holding down bolts as studs and nuts. This must surely be a mistake as studs and nuts are generally only used when the particular fitting can be removed without drawing the studs, which is impossible in the case of a cylinder block mounted directly on the boiler shell, as in *Royal Chester*.

I have in the past lifted the cylinders of various makes of traction engines, and in every case they have been attached to the boiler, either by taper headed bolts, inserted from inside the boiler as in Fowler practice, or by setscrews screwed into tapped holes in the boiler shell.

Any model engineer who may be tempted to use studs will find that they can only be screwed in with the cylinder block in position on the boiler. This may be comparatively easy; removal, however, may be somewhat difficult.

Lee-on-Solent, Hants. W. F. THAIN.

ON SUBMARINES

SIR,—I wish to point out a mistake which I noticed in Vulcan's excellent weekly commentary [Smoke Rings, July 18]. With reference to the attack on the German battleship *Tirpitz* in Alten Fiord on 22 September 1943, the craft employed on this operation did not carry torpedoes; the attack was carried out with the use of remote control detachable side cargoes, containing, I believe, two tons of the then new high explosive amatol.

While on the subject of submarines, has any reader built a working model which has proved capable of diving and surfacing?

May I take this opportunity of saying what a wonderful magazine MODEL ENGINEER is? I eagerly look forward to receiving it every week.

Devon. P. D. BROOKE.

MISSING LINK?

SIR,—I was particularly interested in LBSC's description [ME, July 11] of a Stephenson's link motion which could never have possibly worked.

All my life I have been puzzled as to how *any* Stephenson's link motion could work. On paper, it seems completely hopeless, the lifting link describes an arc, and the valve rod a straight line.

Why, oh, why, doesn't something jam?

Wolverhampton. W. H. DOBBS.

OIL SQUIRTER

SIR,—I thought readers might be interested in a gadget I have just come across.

We recently bought a new type of detergent for washing-up, called SquEzy—the capital E is intentional. It comes in a polythene container with metal end caps, one of which is fitted with a polythene jet and safety cap combined.

When empty these containers can be refilled. I filled mine with cutting oil, and by squeezing hard and putting the jet in a container of oil then releasing pressure the polythene container slowly fills with oil. This process can be repeated once or twice until a reasonable amount is collected.

A well-aimed squeeze will inject cutting oil into several awkward places, i.e., small bores in steel, cutting threads with a die in the tail-stock holder, slitting with a saw. This last operation was steadily consuming the brush I previously used.

Even the new toy will not be necessary when I get my 5s. pump from the scrap yard fitted up. However, there are still a considerable number of applications for such a "squirter," which will suggest themselves. The other thing which appealed to me was that it cost nothing!

Leamington Spa. MAURICE KELLY.

TIMING BY RAILS

SIR,—Having again enjoyed another of Mr Maskelyne's invaluable articles on "Locomotives I Have Known" might I be allowed to suggest that a possible explanation of his timing of the Webb 4-4-0 compound at over 80 m.p.h. *by rail joints* could be that he—naturally enough on the North Western at that date—assumed that the rails were of 60 ft in length?

Could it be that they were actually only 45 ft long? If so, then what was taken for over "80" would in fact have been only over "60."

Did Mr Maskelyne have any experience of the great 4-6-4 Baltic tanks of the Glasgow and South Western Railway? I hope so and that we may then look forward to having them "on parade."

Edinburgh. W. LOCH KIDSTON.

CARNIVAL ENTRY

SIR,—I went to Hastings for a day and saw their carnival. One of the floats was by the Hastings MES and I took a photograph of it.

Twickenham, Middx. A. W. H. R. READ.

The float which Hastings MES entered in their local carnival

CHARABANCS

SIR,—With reference to the photographs and correspondence on old time charabancs, one of these was operated by Mr T. H. Barton, founder of Barton Transport Ltd, Chilwell, Nottingham.

The vehicle is still in existence and in mint condition throughout, body being painted as when originally operated.

It is kept in the chief garage at Chilwell and no doubt could be seen on request. It is often out in processions and carnivals in the surrounding district.

In the entrance hall at head office is a fine collection of photographs depicting various types of buses used by the company since they started 50 years ago.

Beeston, JOHN E. BRAILSFORD.
Notts.

BUILDING A BIG MODEL

SIR,—I have heard it said that a large locomotive cannot be built on a 3½ in. lathe, one particular case being someone who decided that a 3½ in. gauge Royal Scot (I think) was the biggest that it was possible to attempt.

It may be of interest that I am building a 5 in. GWR King, using a Myford ML7; and have had no difficulty whatever.

The driving wheels are 7 in. dia., so that shows that the lathe is well suited to the work. Using a tipped tool the six wheels were done in three to four hours.

It is possible that the locomotive chassis will be on view at the Exhibition on one of the trade stands, and it is likely that drawings of it will be published later on. It will be to scale, and will have all rivets in place; it will have a calculated tractive effort of about 115 lb.

Butzweilerhof, K. E. WILSON.
W Germany.

SUSSEX ENGINE

SIR,—Steam enthusiasts in Sussex may be interested to know that there is a portable engine to be seen about 50 yards from the main Henfield to Horsham road—the A.281—approximately one mile north of Cowfold, just short of the road leading to Warninglid.

The engine is on the west side of the road.

Unfortunately, when I saw the engine recently I was unable to stop —otherwise I would have obtained a few details.

Portslade, ERNEST J. WOODMAN.
Sussex.

LA PORTENA

SIR,—In your issue of July 11 I notice a Mr S. V. Peyton recounts the somewhat apocryphal story of the first locomotive in the Argentine.

Mr John Poole, in *The Locomotive* some years ago, told the true story of *La Portena*, which is, by the way, a 2-2-0. The leading wheels, being the same size as the drivers, give the appearance of an 0-4-0.

Mr Poole pointed out that *La Portena* was built in 1850, when the Crimean War was practically over, and that the choice of 5 ft 6 in. for the gauge was more likely influenced by this gauge already being used in Chile. It was hoped that there would be a link-up with the Buenos Aires Western, on which *La Portena* ran.

Ndola, R. W. REYNOLDS.
Northern Rhodesia.

MORE PROTOTYPES

SIR,—It was with great pleasure that I read Mr Watkins' article on Rochdale steam engines [August 8].

Before being called up for National Service I served my apprenticeship as a draughtsman with Newton, Bean and Mitchell Ltd, engine builders and millwrights, of Bradford. I have worked for five years doing repairs to all makes of engine, and I am sure these must be many others like myself who are interested in them as opposed to the seemingly-endless stream of model locomotives.

Could you do anything about this ?

Aldershot, B. KERSHAW.
Hants.

GROUNDED IN FOG

SIR,—I am a past reader of *Ships and Ship Models*, and a present reader of MODEL ENGINEER.

I have enclosed a snap which I took during my holiday on the East Coast. The vessel is the Dutch coaster *Fiducia* of 225 tons, carrying fruit to Yarmouth. It grounded in thick fog off Wareham in Norfolk and was eventually refloated two days later by the Dutch tug *Maas*.

Harrogate, Yorks. A. H. BAILEY.

The Dutch freighter FIDUCIA *aground off Wareham, Norfolk*

ON JUDGING

SIR,—I feel very confident Mr Maskelyne was in no doubt that he had chosen a very controversial subject when he introduced his article on exhibition judging [August 1].

First, may I congratulate the author on the lucid explanation he has given on his own methods of judging.

The general scheme is excellent, but I have a feeling that the implied hard and fast dividing line between fidelity and design and originality can at times operate to the detriment of certain types of models.

It would be fairer, I feel, if these divisions were a little more fluid. In fact, one could suggest making one division instead of two, which would then read: fidelity, design and originality, with an appropriate maximum of marks.

This suggestion may then well obviate what I feel are the only snags with this system.

I cannot accept the theory that freelance modelling should be able to earn more marks than prototype modelling, for the following reasons:

Original thought for a freelance model must involve, *1* Limitations as

POSTBAG . . .

a craftsman, *2* Equipment limitations, *3* Ability to design (one assumes a full-scale reproduction of a freelance model should function efficiently).

Therefore, the finished design is produced to obviate the problems which the prototype modeller must face when faithfully reproducing in miniature all the known details despite the limitations listed and especially in the case of working models. This requires originality in both thought and construction; in many instances this is unknown to the judges since so much of this work is hidden.

Bournemouth. F. H. Higgs.

WORLD'S LOCOS

Sir,—I have been reading with much interest Mr J. N. Maskelyne's series on "Locomotives I Have Known."

Of course, anything on the steam locomotive is always welcome, but it occurred to me that sooner or later Mr Maskelyne is going to run short of engines. Therefore, why not a series on internationally famous steam locomotives, past and present ?

Your many readers in all parts of the world could supply pictures and data.

Raymond Hutton.

AUSTRALIAN ENGINES

Sir,—I was interested in a recent reference to the 24 in. gauge Fowler locomotives used in Queensland [May 2] having had a great deal to do with them over the last 15 years or so.

Here in the Shire of Douglas we have five of them—four belonging to the Mossman Central Sugar Mill and the other to the Shire Council—ranging in age from 20 to 60 years. The sugar mill line also has a large 0-6-2T built at Bundaberg (Q) to Fowler designs in 1952, this being the newest steam locomotive here. Later engines are diesel-mechanical with hydraulic transmission of various makes—some local and some imported.

The engine I am engaged on now is old *Faugh-a-Ballagh*, an 0-6-0 Fowler tender-tank engine of 1901. Like all the Mossman district engines she is a wood-burner, with a large diamond stack, and is such a free steamer that the blast pipe has no nozzling down whatever. Her boiler is 33 years old, and the machinery inspector estimates it will be good for another six years. Our largest engine is an 0-4-2T built by Perrys at Adelaide in 1949.

Until 1946 the Douglas Shire Council had the only Mallett compound ever to run on the Australian Continent. This was an 0-4-4-0 Orrenstein and Koppell 15 ton tender-tank with $8\frac{1}{2}$ in. $\times$ 12 in. cylinders and Marshall radial valve gear.

We burn wood in this district because of its isolation, and the diamond stack spark arrester is practically standard. This fitment is different to that usually described internally inasmuch as it has no wire gauze but is fitted with vanes to give the smoke a rotary motion. It acts like a centrifuge, trapping the heavier sparks under an internal rim just below the top of the diamond.

The vanes do not restrict the flow of flue gases noticeably, and they make for a free steaming boiler. A faulty spark arrester can damage hundreds of pounds' worth of wagon tarpaulins in a few minutes, quite apart from setting the countryside ablaze.

Loads hauled range up to 180-200 tons and speeds 12-20 m.p.h. on the level.

Remarking on Mr Dunn's letter, the Colonial Sugar Refineries, the largest sugar interest here, estimate that there is over 2,000 miles of 2 ft gauge track in Queensland and about 200 locomotives, mostly steam. The standard track at the present time is 45 lb. rail laid on 5 ft $\times$ 8 in. $\times$ 4 in. sleepers spaced at 24 in. centres.

Old branch lines here and there are still 30 lb. rail, but in places where traffic is heavy I have been told that 60 lb. rails and sleepers at 18 in. centres are being used. These lines carry around nine million tons of cane and sugar annually, so you can see they are no mere toys. In some parts they also hauled passengers, farm and dairy produce, ore, timber, etc., being ordinary common carriers, but today they are merely the handmaidens of the sugar industry.

Some years back I saw a letter in ME criticising an entry in the ME Exhibition, which amused me.

The entry which aroused the ire of the critic was an attractive model of a mill engine of the usual horizontal design. It appears it had a reversing gear which, according to this critic and others at various times, was definitely all wrong. If these good people were to visit me in North Queensland I could show them any number of reversing mill engines, say, several dozen of them, driving cane crushing machinery, mostly with single cylinders of around 24 in. $\times$ 48 in. and 20 ton flywheels.

I ran three of them on my last stationary job in a crushing train and I wouldn't have had them otherwise than reversing.

For the information of future would-be critics, you seldom if ever have to run a mill engine backwards, but if you have to stop or start a full mill train and synchronise the engines all in a few minutes to prevent chokes or gaps in the feed—as you may often have to do—you have no time to fool around stopping the engine with the crank just right for instant starting on each individual engine and neither, believe me, have you the strength or the time to bar one over single-handed when getting away again.

All that is necessary with a reversing engine is to see that the crank is a few degrees off dead centre either way and all is well. Most engines I worked on this job had Stephenson link motion and either piston or Dee valves. One had a peculiar system of drop valves and full reverse off a layshaft, like that on a horizontal oil engine.

The oldest mill engines at Mossman are Nos 2 and 3 in the train with 24 in. $\times$ 48 in. cylinders, the usual size. They were built by Smiths, of Glasgow, in 1895. Their steam pressure is 90 p.s.i. and speed 60 r.p.m. Originally they had underfired multitubular boilers in a battery and made of Lowmoor iron. When sold in 1950 after 53 years of service the last of them were still in excellent condition.

To return to locomotives, our oldest engine running in Queensland is old No 6 on the original register of the Queensland Railways. Of 3 ft 6 in. gauge she is now owned by Bingera Sugar mill near Bundaberg. She was built in 1865. A new boiler was fitted about two years ago so it seems very probable that she will see more than a century of service and must rank among the very oldest working locomotives in the world. She is an 0-4-2 built by Nielsons. A sister engine is preserved in Brisbane.

Should any reader be interested in building a Shay-geared locomotive I have had a bit to do with the smaller two-cylinder ones in the past. One of them is the last surviving Shay in the country, the old *Mapleton* running into Nambour and illustrated in MODEL ENGINEER a few years back. These engines were of the usual 24 in. gauge and would make a quaint model if the external details were followed carefully.

It looks as though my pen has run away with me. However, let me add my praises to the multitude who have already written and say that I think ME gets better and better every year.

I haven't done any modelling recently but I have a couple of small ships to my credit (or otherwise). Have no time now, being fully occupied with my first love, the steam locomotive, in full size. However, when time allows again I should like to start on something in the line of steam.

Mossman, North Queensland. E. M. Loveday.

CLUB NEWS

EDITED BY THE CLUBMAN

SOME modelling societies are, by their enterprise and enthusiasm, an example to the movement. Among them, happily, we find the smaller clubs with modest memberships and facilities, for it is in this atmosphere that the pioneering spirit often expresses itself.

You may have read here of the **Bethnal Green SMEE** whose 11 members were building, earlier this year, no fewer than six locomotives as well as preparing for the Borough of Leyton Show on August 24 and 25. Eleven men with the right spirit may do better than a hundred without it.

I must now tell you what is happening at Romford, in Essex. **Romford MEC** is not a large club. It has about forty members of whom perhaps twenty can be expected to turn up at the meetings in the Red Triangle Club twice a month and at the workshop on Saturday afternoons. The dominant interest is live steam and miniature locomotives.

For engines in gauges of $2\frac{1}{2}$ in. to 5 in. the club has an excellent all-steel continuous track 565 ft in length, with seven three-aspect coloured light signals worked automatically by the trains through ramps between the track.

This year the club has also completed a truck for locomotive testing. The object of this amenity—a bogie driving truck for 5 in. gauge fitted with an oil pump to act as an adjustable brake—is to provide any required load for the engine without the inconvenience of using several trucks and sandbags. A chain drive connects the pump with the two axles of the bogie immediately under the driver.

It will, therefore, be seen that this comparatively small club has not only the essentials but certain interesting refinements as well. One of its other enterprises is a news-sheet that would do credit to larger societies.

I am sure that we all wish further success to Romford MEC, with particular congratulations to L. R. Chilver, who has been chairman for the past twenty-one years.

ME DIARY

August 30 Birmingham SME portable track at West Bromwich show.
August 31 Last day of Model Engineer Exhibition.
September 1 MPBA Grand regatta.
September 5 Eltham and District LS general discussion night, Beehive, 8 p.m.
IEE Supply Section in Belgium (Sept. 5-9).
September 6 Rochdale SMEE "Building the Seal," H. Bonsor.
Manchester SMEE meeting, Onward Hall, Deansgate, 7.30 p.m. Film show.
North London SMEE general meeting, ER Gas Offices, Station Road, New Barnet, 8 p.m.
September 7 NAME meeting, Onward Hall, Deansgate, 2.30 p.m. Following business film "Story of Steel" will be shown.
Birmingham SME national rally, Campbell Green (September 7 and 8).
September 8 *Cancelled*: West London MPBC regatta, Round Pond, Kensington.
IRCMS, Kingsley Hotel, London, WC1.
MPBA Altrincham regatta.
September 9 Altrincham MPBC annual regatta, Lindow Common, Wilmslow Common, Wilmslow, Cheshire, 12.30 p.m.
September 13 Birmingham SMS, "The Panama Canal," Capt. F. J. Marsden.

PIONEERS, PLEASE

Here is another example of enterprise. Shiplovers and ship modellers will be pleased to know that **Reading SMEE** now has a very keen ship section, which meets in the summer at the large pond in the Christ Church meadow just on the north bank of the Thames at Caversham. The section was formed with a nucleus of several power boats.

Everyone who is interested should write to club secretary J. Shayler at 14 Westwood Road, Tilehurst, Reading, Berks.

Some readers in the same general area of the Thames may remember that I mentioned in April the possibility of having a ship model society in Slough, a subject also touched upon by Jason in his notes. William E. Pryor, of 51 St Andrew's Crescent, Windsor, is willing to give all the assistance in his power—but where are the others who will pioneer with him?

HULL GROUP

Many readers must have discovered from the Diary in earlier months that the **IRCMS** now has a group in Hull with headquarters at Sportscraft, Beverley Road. Its aims are to promote, encourage and develop the radio-control of models in Hull and district.

The Hull group meets fortnightly on Tuesdays at 7.30 p.m. Beginners and old hands are equally welcome whether or not they intend to join, and secretary D. Greene of 18 Fitzroy Street, Hull, will be glad to hear at any time from any who share the group's interests.

NATIONAL RALLY

Among the larger societies with plenty of spirit we have, very conspicuously, **Birmingham SME.** Not even holidays can cause us to forget the National Rally at Campbell Green on September 7 and 8.

For the benefit of comparative strangers visiting the National Rally I would mention that Sid Jarrams was elected president of Birmingham SME this year in succession to Rowland Phillips. After serving the society in many different capacities since the war, Mr Phillips has dropped all administrative duties in order to devote his time to modelling.

Sid Jarrams, too, is an old and respected member. And then, of course, we have Ernie Guy—still the busy secretary of this busy society in the middle of England.

DAYS IN THE SUN

You have only to read the Diary to see that the **Railway Enthusiasts' Club** is as full of enthusiasm as its name suggests.

Camping holidays and rail tours are part of the REC summer programme. In July the club travelled, of necessity by coach, along the course of the derelict West Somerset Mineral Railway from Watchet to the one-in-four incline and the former terminus at Gupworthy. Many relics are still to be seen on the route.

The WSMR tour was arranged as a day excursion from Paddington. For the Gloucestershire rail tour on September 15 a connecting diesel car will leave Windsor (GWR) at about 9.15 a.m. and travel to Cheltenham via Slough, West Curve, High Wycombe (connection from Marylebone), Oxford and Kingham. The tour train itself begins its journey from St James Station at about noon and ends it at Severn Tunnel Junction at about 7.20 p.m. Working empty, the diesel car returns direct to Reading and Paddington.

To mark the close of the summer season—a delightful one, I imagine, for all concerned—the club has arranged a rail tour by an auto-train on October 5. This trip covers mineral lines and other little-used tracks in the Guildford, Aldershot and Reading areas. The train leaves Farnborough LSWR Up Bay at 1.40 p.m., and MODEL ENGINEER readers who are not members of the REC may, if they hurry, bag themselves a seat.

Later on the same day, at 7 p.m., the winter season begins with a film show.

Model Engineer

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WORKSHOP EQUIPMENT

Buck & Ryan for Lathes and Workshop Accessories, drilling machines, grinders, electric tools, surface plates, etc.—310-312, Euston Road, London, N.W.1. Phone: Euston 4661.

"Atlas" capstan/turret tooling for any make of machine, new, at ridiculously low prices. Send for fully illustrated, descriptive and priced leaflet to—The Acorn Machine Tool Co. (1936) Ltd., 610/614, Chiswick High Road, W.4. (Telephone No. CHIswick 3416, 5 lines.)

Lathe Chucks, new, 4-jaw independent, in makers' pack, sizes "Burnerd" 3½", 67s. 6d. "Belco" 4", 75s., 4½" H.D., 80s., 8", £7, 10", £9, 16", £16. Also "Acorntools" 6", 80s. Orders and cheques to—The Acorn Machine Tool Co. (1936) Ltd., see advertsement above.

Boxford 4½" centre lathe, 48" bed with chuck and various extras, 230 volt, new condition, cost £165, accept £87 10s. Hand shaping machine with vice, 6¼" stroke, auto feed, cost £25, accept £17 10s. Horizontal steam engine, 1½" bore, 2½" stroke mill-type, accept £12. Model 3½" 0-4-0 tank locomotive "Juliet" type, 50 per cent. completed, excellent workmanship, accept £15 with drawings. Brand new J.A.P. carburettor, 1 h.p. size, 25s. Brand new 12" wood surface planer, 400 volt, 3-phase, complete with electrical gear, £87 10s. Wadkin senior type pattern maker's milling machine with cutters and tools, 400 volt, all electrical gear, weight about 30 cwt., accept £85, tools alone worth double. Air compressor castings complete, 1½" × 2", 37s. 6d. Several two cylinder air compressors with groove pulley, £5 each. Brand new Brooks 2 h.p., 400 volt motors, 1,400 r.p.m., £15. Starters to suit, £3.—Andrews, Willow Green House, Little Leigh, near Northwich.

Immediate Delivery from Stock, Myford "ML7" and "Super 7" lathes, Super Adept lathes, bench planers, shapers, electric motors, small tools.—F. W. Kubach, 12, Sylvan Road, London, S.E.19. LIV 3311-12.

Lathe Chucks. Brand new Burnerd 6" s/centre (model 31), £10. Pratt 6" independent, £6 10s. S/hand 6" independent, excellent, 55s. Another 45s. 2½" s/centre, one jaw defective, 25s. Wolf 0-½" stand drill (£18 10s.), £12 10s.—Box No. 8594, Model Engineer Offices.

Drummond 3½" B.G.S.C. bench lathe, flat bed type, £22 10s. Various others: 2½", 3½", etc., £10 and £12 each. All without equipment. Some stands at £3 10s. each. Stamp.—W. Moldon, 366, King Street, London, W.6.

Myford ML7, motorised, mounted on tray top cabinet with equipment and accessories. Condition as new, £70.—13, Barnstaple Mansions, Rosebery Avenue, London, E.C.1. TERminus 4942.

Myford Lathe Users will be pleased to know that the "Acorntools" toolpost grinder for internal and external grinding is now also available for Myford lathes. For fully descriptive, illustrated and priced literature, write or 'phone the makers—The Acorn Machine Tool Co. (1936) Ltd., 610-614, Chiswick High Road, W.4. (Telephone No. CHIswick 3416.)

Burnerd 3¾" S.C., 75s. Marve ½" chuck, 35s. 2½" × 3½" machine vice, 30s. 12" surface gauge, 25s. Vernier depth gauge, (12") inch/mm., 80s. 4½" toolmaker's straight edge, 17s. 6d. Surface plate glass, 9" × 9" × ¼", 5s. 9d. Klaxon capacitor, 220/240 volt, 2,700 r.p.m., 1/40th h.p., 75s. D.C. voltmeter, 3-range, 5/250 volt, 45s. Push-button starter, 27s. 6d. Jeweller's c/shaft, 15s. Superb 19⅝" cabinet Polyphon musicbox, £18.—125, Crofton Road, Orpington.

New Tools. Send s.a.e. for free lists of twist drills, taps, dies, reamers, thread chasers, cutters, blades, etc., at bargain prices.—A. King, 152, Halfway Street, Sidcup, Kent.

Capacity Available. Turning, light machining, fabrication or small parts, etc. Write—Coombs, 115, West End Road, Southall, Middlesex.

Contents of Workshop for Sale. Cheap for quick sale. Lathe, 3½" × 20" B.G.S.C. by Buck & Hickman, fully motorised. Many accessories, power drill, hand shaper, circular saw, clinometer. Quantity motors shafting, hand tools. Send s.a.e. for list.—Box No. 8610, Model Engineer Offices.

Almost New Aerograph trolley mounted air compressor, output 7 c.f.m., 60 lb., fitted 1 h.p. petrol motor and all to maker's specification, £43 10s. (cost £92)—W. Moldon, 366, King Street, London, W.6.

£30 Latest Zyto 3⅝" motorised on stand, fully equipped. Wanted ML7 or Super 7, cash.—2, Isabella Road, Homerton, London, E.9.

Complete Set Modelmaker's Reamers, handles, 25 paired ⅛" to ½", perfect, £12 o.n.o., or exchange w.h.y.?—E.T.S., "Perch," North Common, Sherfield English, Romsey, Hants.

No. 5 Denbigh Fly-Press as new, £20. Automatic tapper takes up to ¼". Quantity high speed drills, taps. Diamond indenter for Rockwell, perfect, cheap.—T. Hughes, 28, Seafield Road, Colwyn Bay.

3½" Flat Bed Drummond Lathe, B.G.S.C.. needs reconditioning. With stand and treadle. What offers? Please apply to —Hon. Sec. O. W. Upton, 35, Hillingdon Rise, Sevenoaks, Kent.

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ML7 1/3 h.p. Motor, chucks, swiv. slide, tools, castings, etc. Selecta 6" D/E grinder, ⅜" bench drill, 230 a.c. Offers, exchange for car.—19, Chatham Gardens, W. Hartlepool.

4½" Motorised B.G.S.C. Lathe, good working order, £14. ½" Champion drill, motorised as new, £10. Apply Saturday afternoons.—A. E. Hipwell, 111, Euston Road, Farcotton, Northampton.

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Treadle Lathes, 3" B.G.S.C., needs repair, £4, and 4⅜" plain, 3' bed on stand, £5 10s.—58, Virginia Road, Thornton Heath. POL. 8113.

Jigsaw. Table 6" × 6", throat 8½". Uses Eclipse Junior or coping saw, 3-speed countershaft, £5 10s. Photo.—Box No. 8613, Model Engineer Offices.

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Model Engineer

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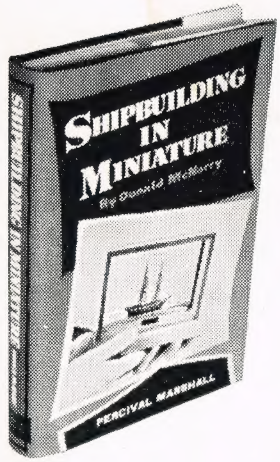

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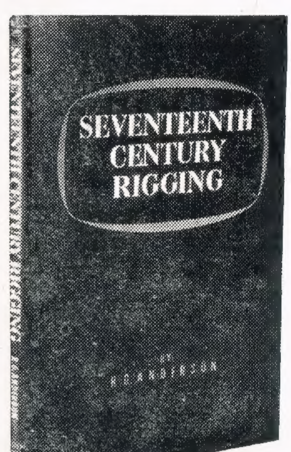

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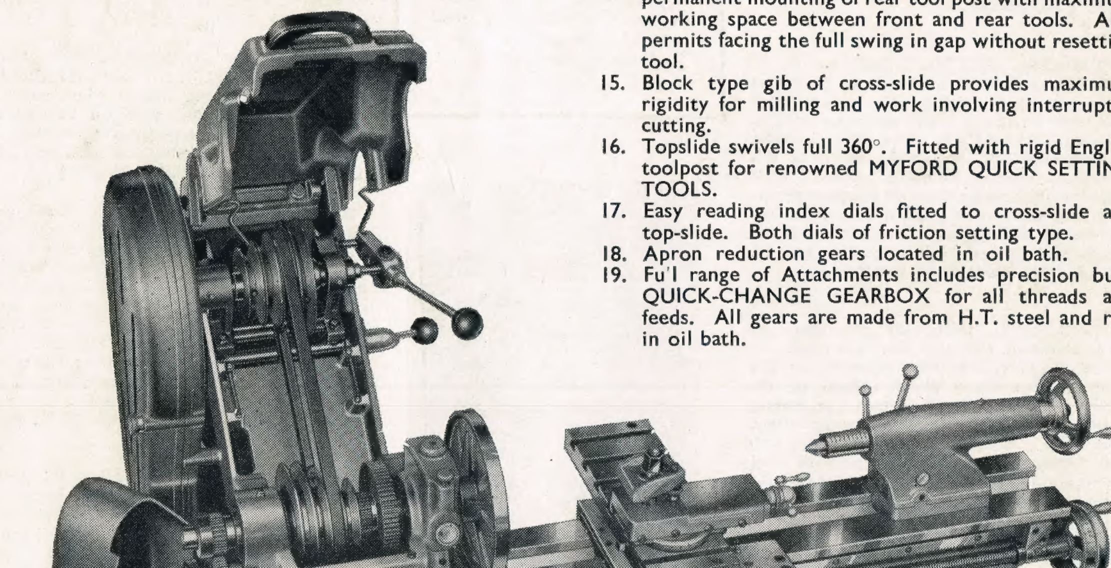

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